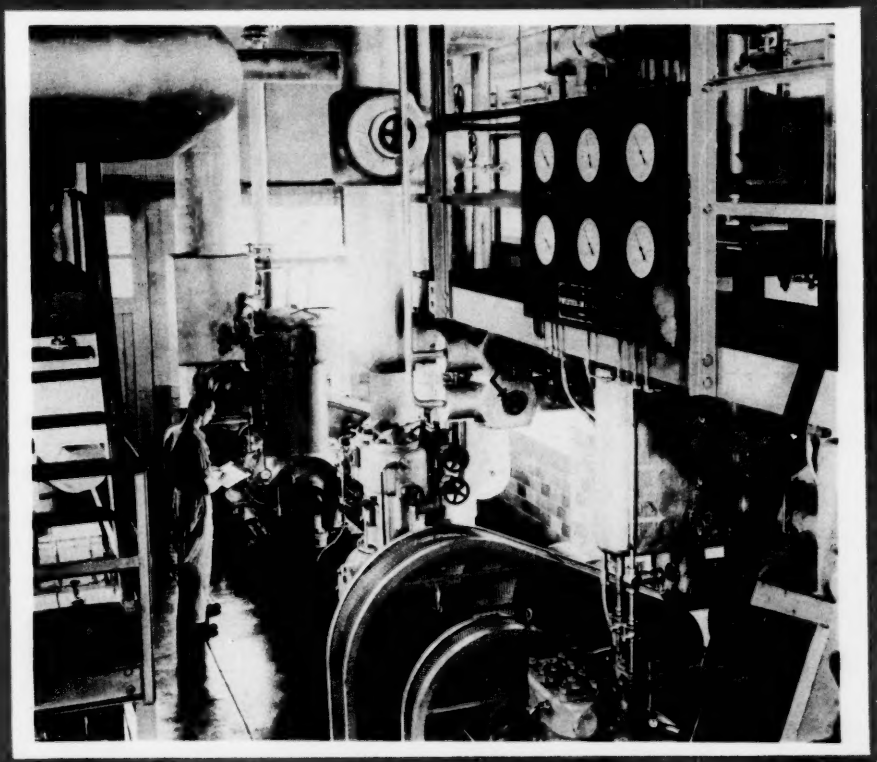
ICE and REFRIGERATION



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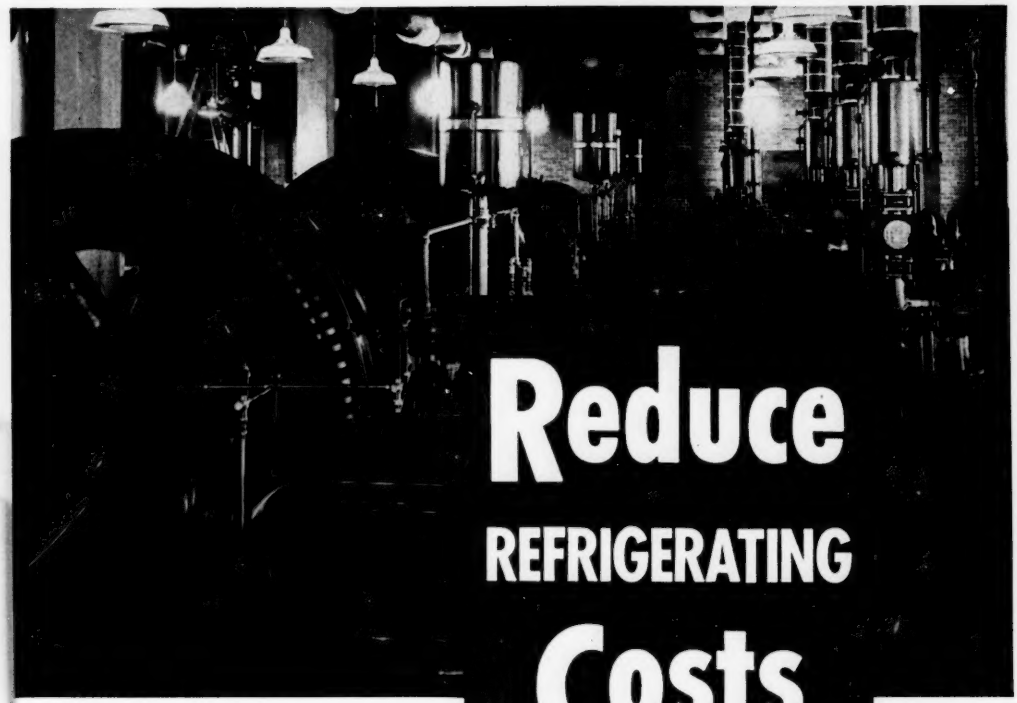
SEPTEMBER • 1950

How to Sell Ice to Mechanical Refrigerator Owners . . Page 22



Reduce REFRIGERATING Costs

Assure clean compressor operation by using TEXACO CAPELLA OILS

You can keep cylinders, coils and valves *clean* by lubricating compressors with *Texaco Capella Oils*. This means greater compressor efficiency . . . lower maintenance costs . . . more refrigeration per dollar.

Texaco Capella Oils are carefully refined to remove harmful impurities, and specially processed to assure extreme stability. They are moisture-free, do not react with refrigerants, and have very low pour tests.

Whatever your compressors or operating conditions, you can get *Texaco Capella Oils* in the proper viscosities to assure efficient operation. A Texaco Lubrication Engineer will gladly help you select the proper ones. Just call the nearest of the more than 2,000 Texaco Wholesale Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

TEXACO Capella Oils

FOR ALL AIR CONDITIONING AND REFRIGERATING EQUIPMENT

TEXACO

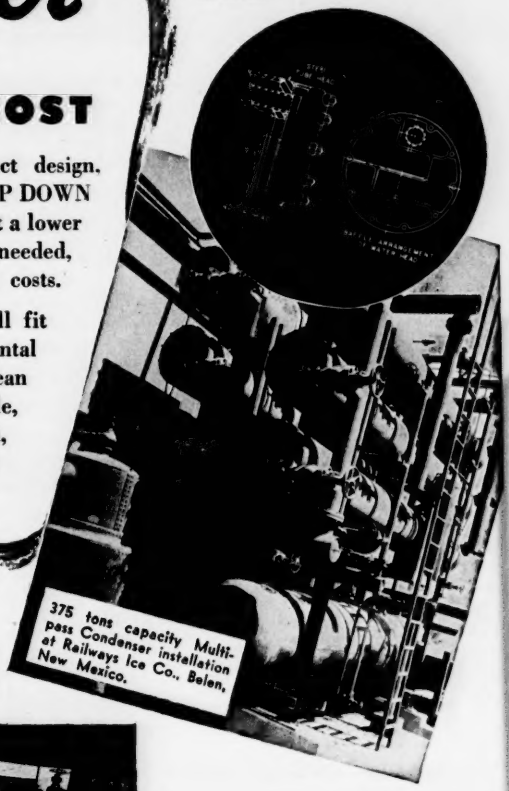
$ave Power and REFRIGERATION COST

Vogt Condensers, because of their correct design, STEP UP the rate of heat transfer and STEP DOWN head pressures. With the liquid delivered at a lower temperature, smaller compressor capacity is needed, saving in original as well as operating costs.

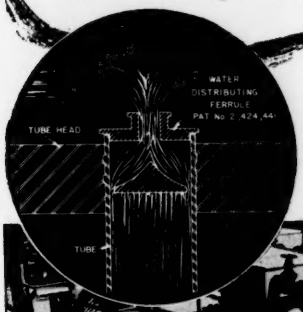
One of the two basic types illustrated will fit your operations exactly. Install Horizontal Multipass (closed type) for use with clean waters. Where the water is hard, forms scale, contains mud or promotes fungus growth, Vertical Single Pass (film type) which can be cleaned in operation, are recommended.

Horizontal Multipass Condensers
(Closed Type)

Water circulated in tubes traverses the length of the unit a number of times as determined by baffles in the heads.



375 tons capacity Multipass Condenser installation at Railways Ice Co., Belen, New Mexico.



Vertical Single Pass Condensers
(Film Type)

Patented ferrules give equal distribution of water to and over the surfaces of all tubes in a unit.

Battery of eight 42"x 16'-0" Vertical, Single Pass, Condensers at Armour and Company, National Stockyards, Illinois.

HORIZONTAL and VERTICAL TYPES SHELL and TUBE CONDENSERS For Every Service

Write For Bulletin RC-1

HENRY VOGT MACHINE COMPANY
INCORPORATED
1000 W. ORMSBY ST., LOUISVILLE 10, KY., U.S.A.
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Vogt REFRIGERATION CONDENSERS

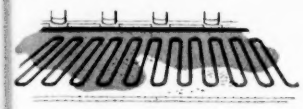
There's a Maintenance Threat in all these services...combat it with

If you have any of these piping services in prospect—watch out for corrosive attack! It's always a threat, and failure to use proper safeguards may mean early and costly maintenance.

Byers Wrought Iron pipe has made some outstanding records for durability in every one of these applications. We'll be glad to give you specific examples on request.

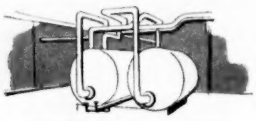
RADIANT HEATING

Wrought iron is now serving in thousands of installations, of all sizes. The superior durability of the material is demonstrated by its comparative service in skating rinks—where conditions are even more severe.



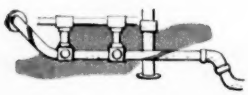
SNOW MELTING

Widely used not only because of its corrosion resistance, but because its mechanical strength protects it from crushing during installation and use.



STEAM RETURN LINES

Condensate is always aggressive. Wrought iron return lines, properly installed, have proven remarkably effective in eliminating excessive repairs and replacements.



WASTE AND VENT LINES

Corrosive sewage gases quickly gnaw away any vulnerable material. Surveys of old buildings reveal wrought iron still serving after periods of up to 50 years.

CONDENSERS

Users have reported service life of 30—40 and even 50 years from wrought iron condensers. One study of 32 condensers showed wrought iron served over twice as long as low first-cost material.

AIR CONDITIONING

Many services are highly corrosive . . . and replacements are difficult and expensive. Wrought iron has been used to safeguard operations in dozens of large installations.

UNDERGROUND LINES

Whether in trench or tunnel, corrosion is always a hazard to underground lines. Here, again, users have reported wrought iron service of over half a century.

The corrosion resistance of wrought iron comes from its unique composition and structure, which halts and disperses attack. Ask for bulletins on any services in which you are interested.

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Ice and Refrigeration

VOLUME 119 NUMBER 3

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September 1950

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"BUTCHER BOY" is the preferred cold storage door of the industry, because it has ALWAYS met every conceivable challenge of hard usage. The strong, massive construction of Butcher Boy doors is the result of "controlled quality" production — a guarantee that they will meet every rigid test of required performance.

Time tested heavy duty hardware applications, PLUS prime insulation, PLUS 100% Douglas Fir Construction is a resultant product equalled by none — BUTCHER BOY. Write for free bulletins today.

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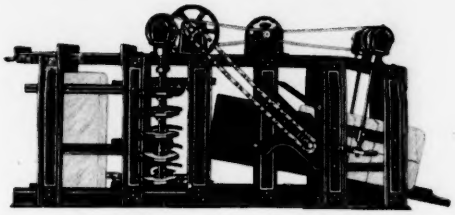
A GREAT NAME *in* ICE SCORING MACHINES

The OLD RELIABLE PERFECTIONS have been known for their rugged dependability and long life for more than 28 years.

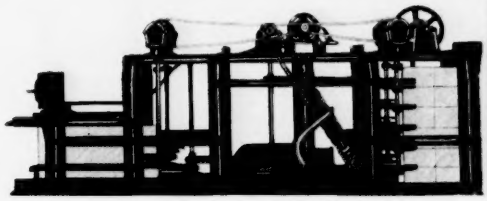


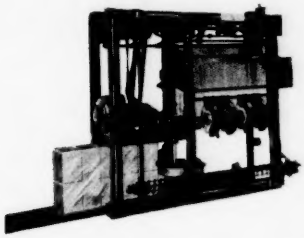
PERFECTION REGULAR

The Perfection REGULAR receives the ice block standing on end, scoring it crosswise first. Then the block enters the tilting cage which turns the block down and it slides by gravity through another set of saws that score it lengthwise. In one operation the REGULAR will score the blocks into any size pieces desired. This machine in 300 and 400 pound size, is 31 inches wide with saw guards in place, or 26 inches wide with saw guards removed. Capacity is six blocks per minute or 360 blocks per hour.

PERFECTION SPECIAL

The PERFECTION SPECIAL receives ice blocks on edge, scores them lengthwise first. Then heads up the blocks, scores them crosswise and discharges them standing on end. This is a combined heading and scoring machine and scores the blocks into any size pieces desired in one complete operation. Capacity is 4½ blocks per minute or 270 blocks per hour.





PERFECTION "MILLER"

The MILLER machine receives the ice block lengthwise on edge. It is first lifted up and scored crosswise, passing the same saws again on the way down. It is then (without leaving the machine) automatically conveyed through the saws which score it lengthwise. Only one operation is necessary for complete scoring. Block is put through machine only once. The capacity is six blocks per minute, or with 300 lb. blocks, over 50 tons per hour. With 400 lbs. blocks this output is increased to 65 tons per hour.

Perfection scoring machines have been serving the ice industry for more than 28 years in plants scattered all over the nation. The quality and efficiency of these machines is well known to most ice manufacturers.

During World War II it was very difficult to secure repair parts and the ice manufacturers as well as ourselves can well remember the headaches caused by conditions during that period. Our company served you to the best of its ability then and will continue to do so in the present emergency as long as we are able to secure the necessary materials.

We have on hand at the present time ample stocks of repair parts and are in position to give you prompt service on any parts needed to repair your Perfection machines. New machines are also available now. How long this condition will prevail we do not know, therefore, we urge you to anticipate your requirements and order as promptly as possible.

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Du Pont "National" is 99.99% minimum anhydrous ammonia . . . so be sure to use it for top performance of your refrigeration equipment. It is always pure, uniform, dependable, dry Anhydrous Ammonia. E. I. du Pont de Nemours & Co. (Inc.), Polychemicals Dept., Wilmington 98, Delaware. BRANCH OFFICES: 350 Fifth Avenue, New York 1, New York; 7 South Dearborn Street, Chicago 3, Illinois; 818 Olive Street, St. Louis 1, Missouri.

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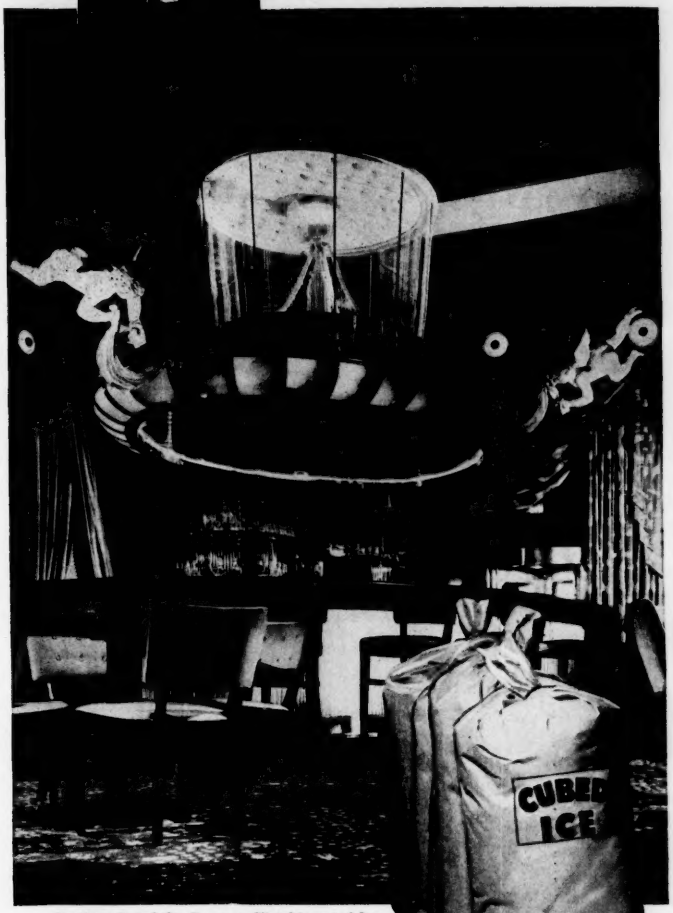
"For a fine hotel, Packaged Processed Ice is a sanitary necessity"

says Nino Bignami, Director Food & Beverage, Congress Hotel, Chicago Illinois



The Glass Hat of the Congress Hotel is noted for its glamour and gaiety on Chicago's famous Michigan Boulevard.

Wet-Strength Paper Ice Bags have tremendous strength even when soaking wet...thanks to a water repellent resin that binds the fibres of the paper firmly together.

The Extra Service That Makes the Sale

SMART BARS and eating places can't take chances with processed ice. It must be 100% free of contamination, dirt, foreign particles. That's why so many of them today insist on processed ice packaged in Union Paper Ice Bags. The wire tie locks out dirt, bars spillage or pilferage.

The Union one-trip Paper Ice Bag cuts your costs, too. The sturdy wet-strength paper—two layers thick—retards melting. Handling is speeded up—at the ice processor, loading dock, delivery point.

You'll find, too, that customers use more ice; it is so easy for them to ice from the handy paper bag.

Month after month more ice companies build new business with the Union Paper Ice Bag. Join the parade. Write for free samples today.

ONE TRIP

UNION Paper Ice Bags

A product of the **UNION BAG & PAPER CORPORATION**, Woolworth Bldg., New York 7, N. Y.

Bags of Kraft, Transparent Films, Waxed Paper, Glassine, Laminates

INSTALLATION FILE NO. 1009

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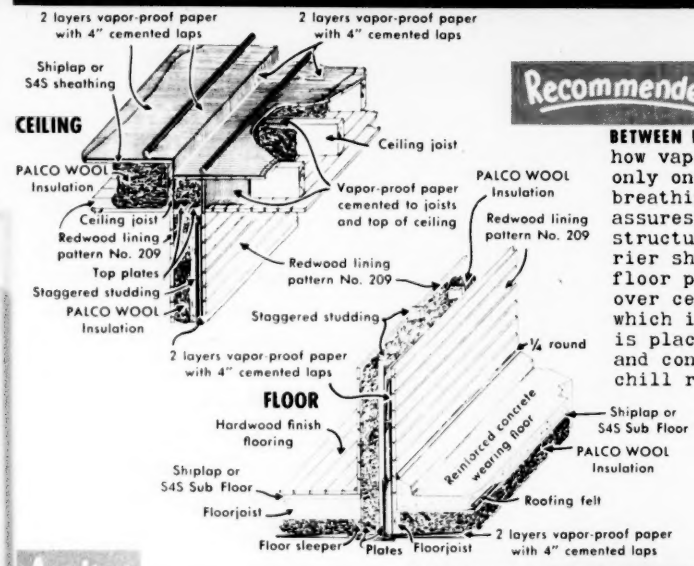


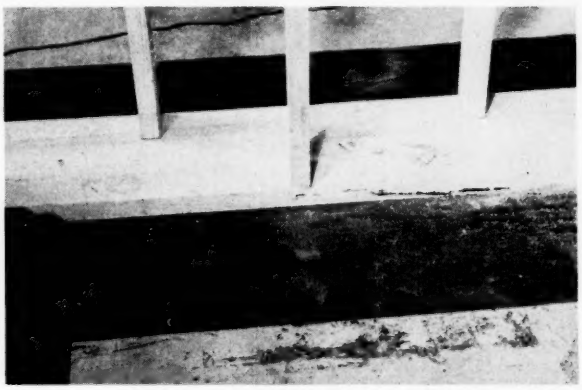
Recommended

PARTITION CONSTRUCTION BETWEEN FREEZER AND COOLER– Note how vapor proof paper is placed only on warmest side to permit breathing to cold side. This assures dry insulation and structural members. Vapor barrier should be continuous under floor plates, up warm wall, over ceiling. Roofing felt which is permeable to moisture is placed between sub floor and concrete wearing floor in chill room.

Applied

BURRIS BROS. LOCKER PLANT, FRANKLINTON, LA.– Photograph shows placement of vapor barrier under wall plate, and staggered studding to minimize connection through insulation. Refrigeration engineers specify PALCO WOOL Insulation because it is exceptionally efficient,* moisture resistant, non-settling, odor-proof, repellent to rodents and insects, resistant to fungus or decay -- and FLAMEPROOFED.

*Thermal conductivity of only .255 B.t.u.



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For Ice That Will Not Produce Slime In Ice Boxes...

Use DISTILEX This Way...

Dispense with Soda Ash, Sodium Aluminate, Alum and Similar Products . . . and

SIMPLY MIX DISTILEX WITH THE LIME YOU ARE NOW USING!

Block on left treated with Distilex, only one core emptied. Right, untreated water, cores were emptied twice. Most Distilex users do not empty cores at all.

RESULT . . . . High-grade Crystal Ice from raw water . . . Ice free from slime and deposits . . . Ice without color, odor, taste . . . Ice which can be produced at very low temperature* with no cracking while being frozen, dumped or cut.

***DISTILEX** treated water can make Ice in LESS THAN 25 HOURS at 10° brine temperature!

Test DISTILEX in your plant. If not entirely satisfied, purchase price will be refunded on all DISTILEX returned. $25.00 per 100 lbs., f.o.b. Birmingham.

Use SOLVEX for COMPRESSOR COOLING SYSTEMS

HIGH HEAD PRESSURES QUICKLY LOWERED with this remarkable chemical. SOLVEX can be quickly applied without breaking a joint. REMOVES RUST, SCALE, ALGAE, OIL AND ENCRUSTING MATTER from condenser tubes and water jackets in one to five days operation. Ideal for cleaning scale and corrosion from boilers, heaters and tanks.

An effective conditioner for spray ponds and cooling towers. SOLVEX goes to work immediately WITHOUT COSTLY SHUTDOWNS. Cooling efficiency is rapidly restored by using one pound per 10 gallons of water.

Write NOW for Further Particulars on These MONEY-SAVING AIDS TO BETTER ICE MAKING!

The CSCO STABLEIZER MAINTAINS GOOD BRINE by a positive reaction to either OVER-ACIDITY or OVER-ALKALINITY!

A scientific combination of pure metals upon which damaging materials in brine will "feed" in preference to the brine tank or ice cans, thereby SAVING them!

the CSCO STABLEIZER removes destructive material from the brine without adding harmful chemicals. Easily installed in all systems. No other brine treatment compares in SAFETY! The STABLEIZER does not make brine harmful to workmen's hands. PROTECTS AND PRESERVES EXPENSIVE EQUIPMENT!

CHEMICAL SOLVENT COMPANY

3005—16th Street North — Birmingham, Ala.

SURE-ACTING ALCO J-5 FLOAT SWITCHES

for Ammonia, Freon, Methyl Chloride

...for more dependable liquid level control on any type of flooded low side

The sturdy simplicity of ALCO Type J-5 Float Switches assures positive, trouble-free action in a wide variety of applications:

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- Liquid Sump Pump Controls
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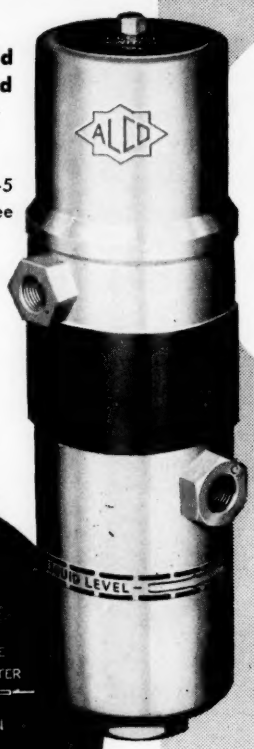

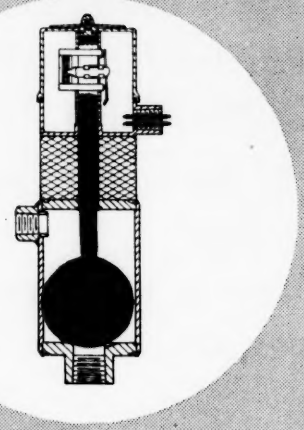

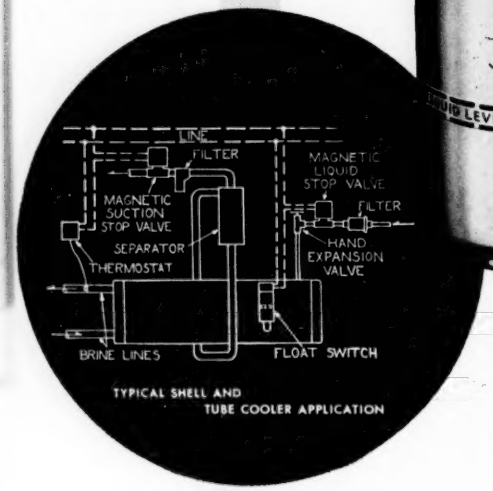

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Only two major parts—float chamber assembly and mercury switch relay assembly—separated by 2½" cork insulation to prevent frosting of relay. Differential of ⅝" in liquid level "makes" circuit when level drops, "breaks" circuit when it rises (reverse action also available). Type J-5 Float Switches operate on any voltage or frequency up to 440 v., 60 cy. A. C. or 250 v. D. C. Write for Bulletins 175, 175-1 for full details.

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ALCO VALVE CO.

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Designers and Manufacturers of Thermostatic Expansion Valves; Evaporator Pressure Regulators; Solenoid Valves; Float Valves; Float Switches.

SEE YOUR ALCO WHOLESALER

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In The Spotlight

VENDING STATIONS sell more ice at better prices according to many ice men who successfully operate such stations. Practical details of operation, the returns, and some pitfalls, are discussed in the article on page 22.

A NEW FOOD FREEZING plant at Prosser, Wash., is equipped to process a minimum pack of four million pounds of fruits and vegetables per year, and represents an investment of approximately a quarter million dollars. It has a number of innovations and individually designed equipment. See page 47.

MODERNIZING an old ice plant may be a major operation, particularly if the owner is not an experienced ice man. The story of how Joe Gramling of Plant City, Fla., overcame that obstacle is told on page 19.

FIRST ESTABLISHED in 1891, the Philadelphia Warehousing and Cold Storage Company has been completely modernized with new equipment and enlarged space. For details see page 13.

FREEZING QUALITIES of some apples are better than others. To determine which kinds are best, a study was conducted by the Michigan Agricultural Experiment Station. Results and conclusions are given in the article on page 41.

REFRIGERATED VANS, cooled with dry ice, are used to ship perishable food from Tacoma, Wash. to Alaska. The vans, built as truck trailers, are hauled to the dock and loaded on barges. For details see pictures and article on page 15.

COVER: Pictured above is the pneumatically controlled two-ton doors opening into the "cold test" room maintained by the compressors shown on the front cover at the plant of the Caterpillar Tractor plant.

THE SAFETY CODE for mechanical refrigeration has been revised and brought up to date by an industry committee sponsored by the American Society of Refrigerating Engineers. As approved by A.S.R.E. and the American Standards Association, sections on industrial plants are reviewed on page 31.

POULTRY ICING is a big market for ice. A food store survey in Akron, Ohio shows that 87 percent of the grocers know that poultry stored and displayed in ice is a better product.

HOUSEHOLD CONSUMER purchases of frozen concentrated orange juice which a year ago accounted for only five percent of total orange and orange product purchases, now account for 19 percent of total purchases.

POULTRY PROCESSORS offer a market for crushed ice. Only about half of them use ice now. Ice-packed poultry is a better product and sells better.

LETTERS

Alert to Needs

VERILY "the old order changeth" —at least in so far as ICE AND REFRIGERATION is concerned. It strikes me as significant that these changes in format should come now, at a time when refrigerated warehousing stands at the forefront of our perishable food economy. ICE AND REFRIGERATION'S efforts to progress are a sign of the times. They constitute a road mark along the way toward the ultimate in publication service to the cold storage field.

In keeping abreast of these things, it goes without saying that ICE AND REFRIGERATION has the full cooperation of N.A.R.W. It's very reassuring to know that our trade press is so alert to the needs of the hour.

WM. DALTON, Exec. Vice-Pres.,
National Association
Refrigerated Warehouses
Washington, D. C.

New Format Approved

THE new format is an improvement — indeed a very fine improvement, and I congratulate you and the publishers on the change. We always welcome "ICE AND REFRIGERATION" in its monthly visit to our office and it is read by all of us with interest. You are doing an excellent job and I know that that job will be continued under your efficient stewardship.

VALLEE O. APPEL
Fulton Market Cold
Storage Co.
Chicago, Ill.

Cover Picture Pleases

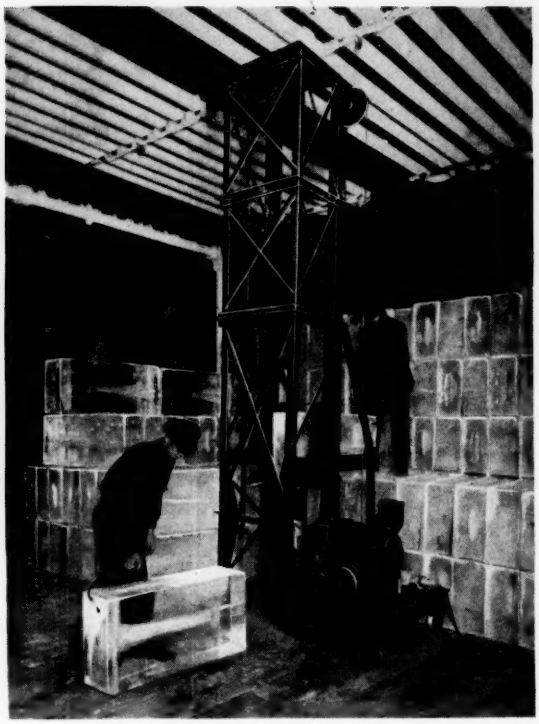
WE WERE very elated and pleased with the splendid treatment given Continental Freezers, Inc. in your June issue. Particularly were we surprised to find our engine room gracing the cover. To me that is comparable to the "Man of the Year" on your contemporary "Time."

K. F. STEPLETON
Continental Freezers, Inc.
Lafayette, Ind.

Ice Industry Should Be Proud

WE COMPLIMENT you on your new format. Your cover is neat, appropriate and colorful. Your table of contents is readily accessible and the bold-faced type used minimizes the time needed to find the topic (s) you are looking for. All in all our ice industry should be very proud of the publication—ICE AND REFRIGERATION.

R. N. MILLING, SECRETARY
DELTA STATES ICE ASSOCIATION



TO ORDER G-W'S TYPE "N" TIERING MACHINE

Save *space... money... man-hours* by getting a portable G-W Type "N" Tiering Machine now! The Type "N" is FAST, ACCURATE and STEADY as a rock. A compact, three H.P. motor gives it a lifting speed of 113 feet per minute. An automatic tier finder selects any tier height through a simple setting of the dial. It's RUGGED and STEADY, even when lifting a 300 or 400-lb cake *ten tiers high!*

Push button operation gives you quick, sure control of the machine. All wiring meets underwriters' specifications.

G-W offers a complete line of ice tiering machines to serve ice storages of every size. Special units can be designed and built to meet your specifications. Learn more about these time-saving, money-saving tiering machines by having a G-W representative call. Or write for Bulletin No. 451.

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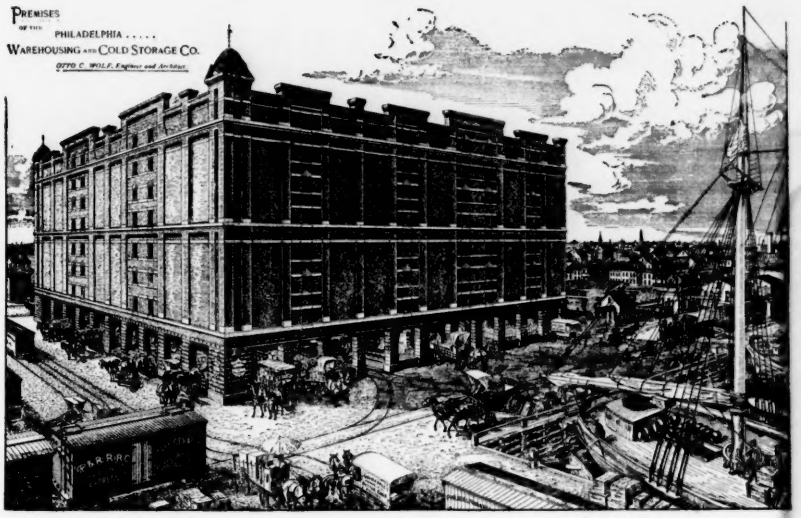
T036

Warehouse Modernized—Space And Efficiency Increased

Early Philadelphia refrigerated warehouse originally completed in 1891, now completely modernized and enlarged with 2,150,000 cubic feet of refrigerated space

TERRY MITCHELL



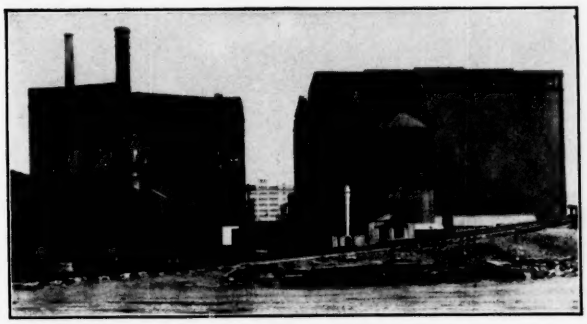
This engraving, showing the first of the 8-story buildings of the Philadelphia Warehousing and Cold Storage Co., was published in "Ice & Refrigeration" in 1891.

THE Philadelphia Warehousing and Cold Storage Company was chartered April 20, 1873. In the first issue of ICE AND REFRIGERATION, published in July, 1891, the then new plant of the company in Front Street, Philadelphia, was described in a feature article. The handsome building, measuring 150 by 125 by 120 ft. high, was illustrated by a full-page pen drawing, done by hand and showing every detail, including the horse-drawn wagons and sailing ships of the day.

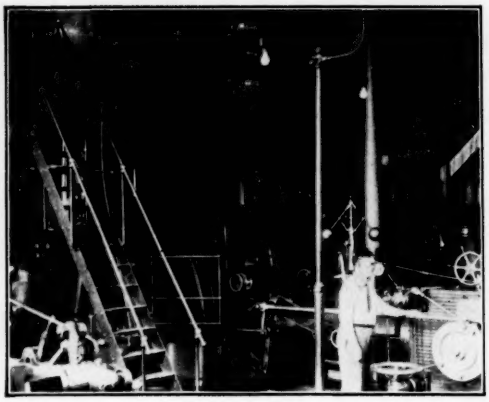
At that time the firm had 973,000 cubic feet of space under refrigeration. The big structure, completed just previous, was equipped with two steam-driven Consolidated compressors, each producing 125 tons of refrigeration. A Corliss steam engine was mounted between the two ammonia cylinders of each machine. These compressors gave remarkable service, and were in use more than 55 years. The original equipment included a 50-ton distilled-water ice-making system. In 1911 another steam-driven vertical compressor of 175 tons capacity was added, to take care of increasing loads.

The present three buildings of the company, each eight stories high, occupy the city block between Delaware Avenue, Noble Street, Beach Street and Front. The storage space now comprises about 2,150,000 cubic feet. Three sidings of the Reading Railroad accommodates 22 cars at a time. The platform and top floor of each of the warehouses are used for general storage, but all the other six stories are refrigerated. The company specializes in the storage of butter, eggs, poultry, meat, fruit and similar perishables, although other products are handled also.

Harold W. Russell is president of



The three present buildings occupy a city block on the waterfront



Under expert care, the steam-driven Consolidated compressors were kept in operation for more than 55 years.

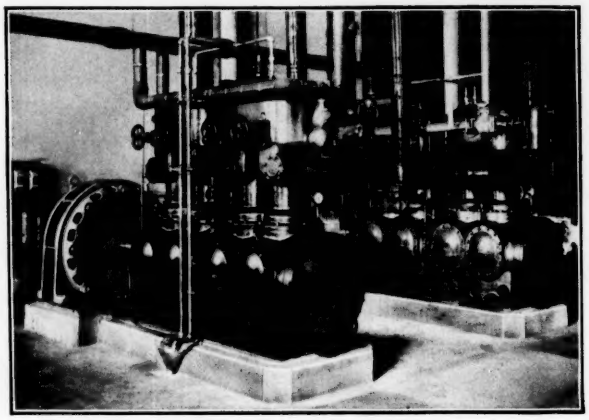
Four-cylinder Frick compressors, with synchronous motor drives, which now carry the main load.

the company, Harvey R. Kiefaber is vice president, and R. H. Mixner is secretary and treasurer. John H. Walsh is chief engineer.

Modernization Completed

The recent war delayed the projected modernization of the refrigerating equipment, but this work has now been completed. The new machines comprise a pair with four cylinders each and a pair of others with two cylinders each. The largest compressor has cylinders of 11 in. bore and 10 in. stroke and is driven by a synchronous motor of 300 hp. The second 4-cylinder machine is a 10 by 10; this is driven by a 250 hp motor.

Of the 2-cylinder compressors, one is a 10 by 10 and the other a 9 by 9. These machines have motors of 125 and 100 hp. respectively. All the compressors are fitted with capacity controls, and all have Flexo-Seals on the shafts. An ebony-asbestos board holds four pressure gauges of 12-in. size. All of the synchronous motors, motor-generator sets and starting panels were made by the Ideal Electric and Manufacturing Company.

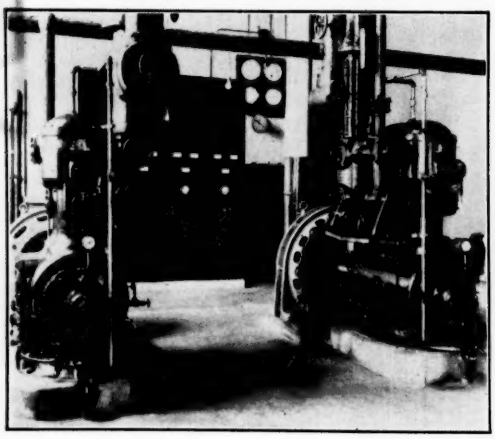


Brine Cooling

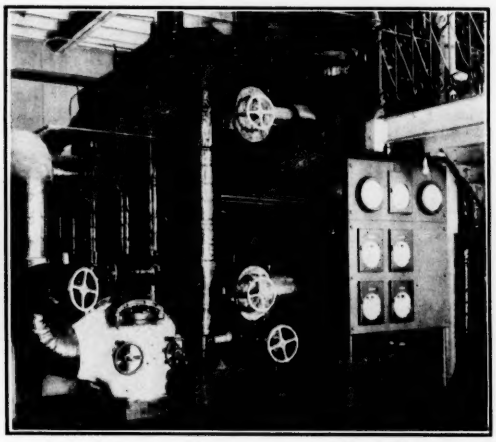
The machines are connected to a battery of four large shell-and-tube brine coolers, each having a diameter of 42 in. and a length of 18 ft. The shells are equipped with double suction connections and with dual relief valves.

The brine makes six passes in going through each shell. Each shell has its own float valve control for the ammonia feed, and is kept flooded with liquid. The suction lines are carried to an accumulator of unusual size, measuring 54 in. in diameter by 10 ft. in height. This is mounted near the ceiling, which is 25 feet above the floor, and is equipped with a liquid-level gauge, dual relief valves, and a large equalizing line. Below the accumulator is a liquid ammonia pump, which returns the refrigerant caught in the vessel direct to the re-

(Continued on page 52)

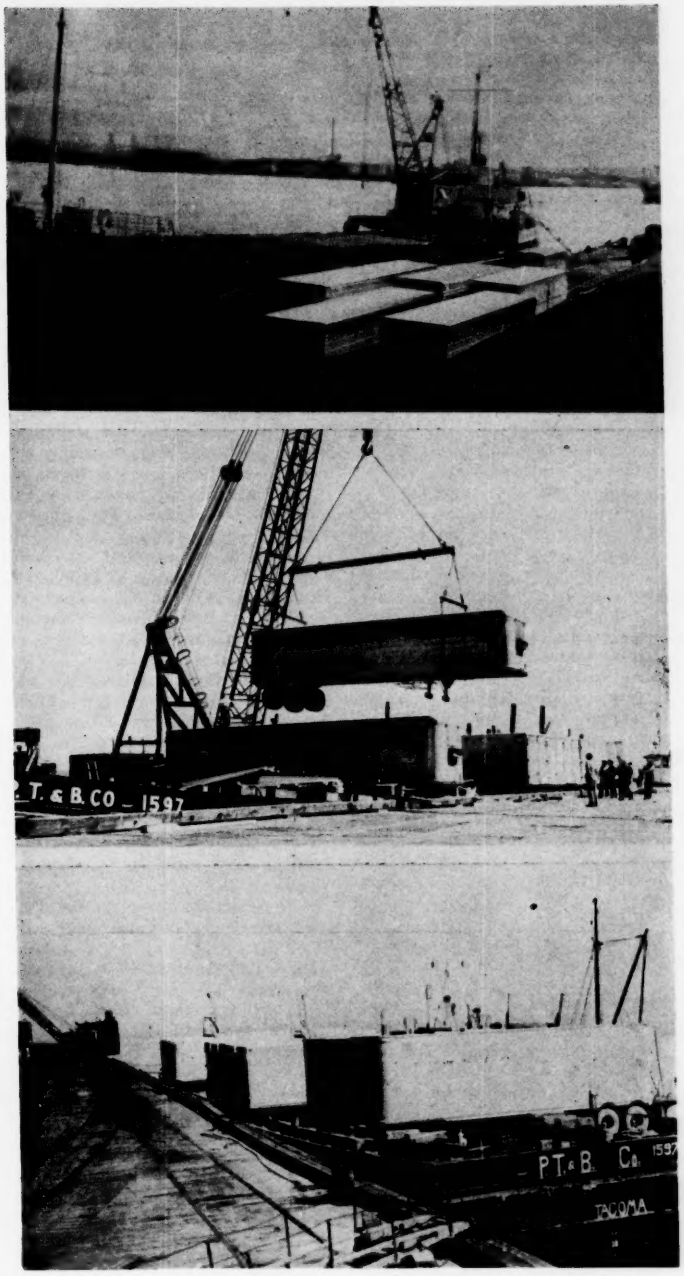


Two-cylinder compressors and electrical equipment adjoining 4-cylinder machines.



Two of the four brine coolers, with connections to pumps, strainers, etc.

SHIPPING FOOD TO ALASKA



Shipping refrigerated foods to Alaska. Top: The trailership "Asa Lathrop," with refrigerated vans on dock. Middle: Loading refrigerated foods vans at Tacoma dock. Bottom: A barge loaded with refrigerated vans bound for Alaska.

Refrigerated freight vans packed with perishable food now shipped by truck, and barge from Tacoma to an Alaskan port. Contents held at proper temperature with dry ice.

THE constantly rising freight shipping costs during past years from the Pacific Northwest to Alaska, particularly on perishable foods, had almost wiped out freighting of these highly desirable commodities to the far North. Now comes Alfred Ghezzi, Jr., 30-year-old citizen of Fairbanks, Alaska, with a new and novel idea involving the transporting via water route on barges and a big trailership, fully loaded, refrigerated freight vans or reefers, packed with perishable fresh foods for hungry Alaskans.

To carry out his original idea, Mr. Ghezzi organized the Alaska Freight Lines, Inc., which now has in operation its first trailership, the Asa Lathrop and several large, sea-going barges which transport the big 30- to 40-ton freight vans from Tacoma to the Alaskan port of Valdez. The refrigerated reefers or vans are loaded in Seattle and pulled to the Tacoma dock terminal by truck. Here they are unhitched and lifted bodily by huge cranes into the trailership or on barges, where they are set on big wooden blocks and securely shackled to the decks with heavy chains to prevent any movement during their six-day water voyage to Alaska.

Dry Ice Maintains Temperatures

Approximately three tons of dry ice are stored throughout each freight van to maintain freezing temperatures for an eight-day period and preserve the precious cargoes of perishable foods until they reach their destination.

According to Mr. Ghezzi, his unusual freighting venture will go far towards solving Alaska's long and vexing problem of rising freight costs from the states. Alaskans like their fresh meats, fruits, vegetables and frozen commodities of all kinds as

much as any American and perhaps more, since these desirable foods are generally scarce throughout the far North. Because of prohibitive freight costs they have been largely deprived of these desirable foods. Canadian shippers have stepped into the situation also and because of their lower freight costs and closer proximity to Alaskan ports, have been taking a good slice of this business away from American shippers.

Ordinarily, packaged cargo is loaded onto a truck or railroad car, then unloaded at the dock warehouse, carried onto an Alaska bound ship and then put through the same process in reverse when the vessel reaches its northern destination. All of these operations involve heavy and numerous shipping and handling charges.

Under Ghezzi's novel labor-saving operation, the freight vans are loaded at the actual cargo's point of origin, which may be any place in the West. The vans are then pulled by trucks via highways directly to the shipping dock in Tacoma. Here they are lifted bodily onto the trailership or barges. Reaching Valdez, Alaska, they are unloaded bodily onto the dock, hitched again to trucks and pulled via highways directly to their destination at any Alaskan point.

Freight Costs Reduced

The considerable elimination in the number of handling operations greatly reduces freight costs under Ghezzi's operation and hungry Alaskans get their fresh, vitamin refrigerated foods at more reasonable prices and for the year round. In addition, company officials state that owing to the peculiarly "tight" nature of their freighting operation, pilfering of freight in transit is practically nonexistent. This nefarious practice of stealing packaged freight while in transit has become so common and widespread in recent years that shippers are having nightmares over the possible results.

To date, all refrigerated cargoes handled by the new shipping line have been of a military nature, shipped to Valdez in vans for transhipment via trucks and trailers to military posts throughout Alaska. E. W. Handley, vice-president of the company, announces that the company expects shortly to publish a commercial tarriff on shipments of general and refrigerated cargo to and from Valdez. Additional barges will be added to the fleet as commercial freight business accelerates, which is expected to grow rapidly.

In addition to carrying considerable packaged freight, the trailership can carry twenty-five of the big freight vans, while each barge can carry eighteen, placed crosswise on the decks. A stout, sea-going tugboat pulls each barge north via the tranquil Inside Passage route to Alaska, coming out into the open sea and crossing the stormy Gulf of Alaska to Valdez. Each tugboat is radar-equipped, enabling them to safely navigate the often fog-shrouded Inside Passage on a clock-like, every-other-week schedule from Tacoma.

Carbon Dioxide Suffocates Dock Hands

A recent tragic accident connected with loading refrigerated vans on the trailership at the Tacoma dock sharply emphasized the ever present dangers of using dry ice as a refrigerant in enclosed spaces without proper ventilation. A crew of longshoremen had descended into the hold of the Lathrop on the morning shift to complete loading of the reefer vans. As they reached the hold bottom, three of the men suddenly collapsed and died almost instantly from inhaling carbon dioxide gas which had accumulated overnight in the hold from the dry ice refrigerant stored in the vans already loaded aboard. The rest of the crew managed to scramble to safety after assisting three more of the crew who had also been overcome by the gas. City firemen were called to recover the bodies of the three victims.

In this case, a dense accumulation of the heavy gas at the bottom of the hold had replaced the air oxygen. Apparently, the longshoremen had reached the bottom of the hold before the blower fans being used had a chance to clear the carbon dioxide gas and replace it with fresh air.

Use of Barges

The use of barges instead of the trailership for transporting the vans eliminates any possible dangers from gas poisoning since all loading operations are out in the open. It is believed that use of the trailership will be abandoned in favor of the barges since the latter are also cheaper and easier to operate, requiring only half as many workmen, both for loading operations and for operating the tugboats.

This novel freight shipping operation clearly demonstrates however, that dry ice refrigeration is profitable and fully effective for perishable foods, even if large amounts of dry ice are required and the shipping period covers a week's time or longer.

The rapidly increasing population of Alaska and the resulting big demand and need for fresh meats, fruits, vegetables and refrigerated foods from the states all through the year, definitely assures the future success and great need for the new venture of sea-going refrigerated transportation.

New Fishing Boat Speeds Catching and Processing

THE New England fishing industry's first experiments with a "factory ship" has been declared a success. Oceanlife, owners of the trawler, converted at a cost of $225,-000 is satisfied with the tests it has made which have demonstrated the practicability of processing, packaging and freezing fish aboard the ship making the catch. Bromfield Manufacturing Co. of which Isadore Bromfield is head, owns the trawler. It carries a crew of 25 men and 68 observers have made experimental runs to a point of 30 miles beyond Boston Light.

While cruising around Massachusetts Bay under varying weather and water conditions, the crew scaled, filleted, weighed and quick-froze 10,-000 pounds of fish. The fish was ready for distribution in neatly packed fillets when the trawler landed. The Oceanlife will join the fishing fleet as soon as final adjustments are made. The ship is expected to handle about 200,000 pounds of packaged fish on each trip.

Such "factory" trawlers are in use along the Pacific Coast and also by some Russian, British and Japanese fishermen, but are new to the New England fishing fleet. The hold of th Oceanlife formerly had a 500,000 pound capacity, but it was reduced to make room for a processing plant, and a quick freeze room where the fish are kept until they can be handled.

Mr. Bromfield who had the 150-foot trawler Cormorant converted into Oceanlife, says the new mode of fishing and processing has many advantages. A "factory" ship can remain out for several weeks without fear of spoilage. It can go out to deep water to get better fish and freeze them quickly to retain flavor. No large cargoes of ice are necessary and fish are not bruised by being packed in ice chunks, and by handling at the unloading point.

Fish are chuted from the deck to a scaling table. They are then filleted and passed by conveyors through a brine tank to weighing and packaging tables. Fish are packed in five pound packages and then quick frozen. Ten packages are then sealed into a carton and stored in the hold at five degrees below zero, to await delivery.

New York Tightens Air Conditioning Regulations

TIGHTER regulations on air conditioning to eliminate all wasteful use of water are being considered in New York City. The City Department of Water Supply last winter adopted rules specifying that all air-conditioning equipment of three tons or more should use recirculated water. The rule applied to both new installations and to equipment already in use.

Asserting it was important both for the city and the air conditioning industry to make certain that undue water waset was stopped, Commissioner Stephen J. Carney, in revealing that a further tightening of regulations on air condition was in prospect, pointed out that even a three-ton unit wastes two to four gallons of water a ton a minute. He noted that even this small waste, or less, if multiplied in the next few years by thousands of small air-conditioning units, might become a burden that the city's water supply system could not stand.

Carney disclosed he had been conferring with 25 representatives of air-conditioning equipment manufacturers. Aware that New York City's policies are under close study by other cities, especially those in arid areas, the industry's representatives share the city's interest in reaching a solution that would protect both the city's water supply and the industry.

Committee to Study Problem

Pointing out that inadequate regulations could stunt the air conditioning industry's growth, Mr. Carney said the industry's representatives would name a committee to help him study the problem. Other city departments affected by the matter, such as the Department of Housing and Buildings, are expected to assist in the study.

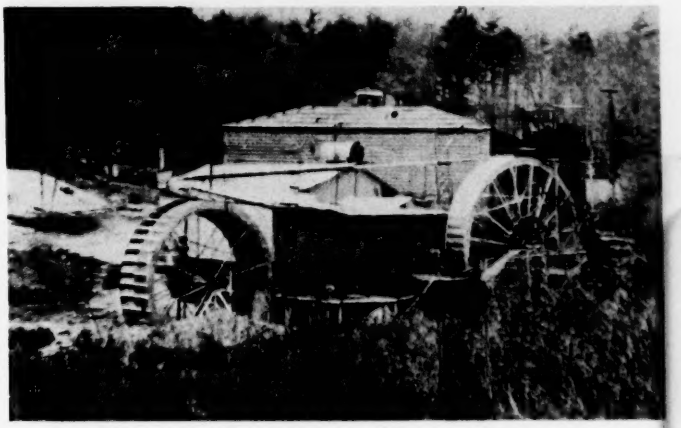
"Our common objective," he said, "is to cut down water waste without working a hardship on the air-conditioning industry. The industry men recognize our great shortage hazard and want to go along with us. The conclusions we reach, I am sure, will have an effect far beyond the boundaries of New York City, so what we do must be right."

The air-conditioning equipment regulatory rules adopted by New York City last winter became effective June 1. Carney said that contractors were making satisfactory progress in converting old-style equipment to the use of recirculating water, as required by the rules.

Water Wheels Drive Refrigeration Plant

E. P. HOLMES

SOME 50 years ago, to fail to spend part of the summer at some well known mineral springs was not only committing social suicide but also suicide from a health standpoint. Otherwise how was one to build up his system against the rigors of a cold and bitter winter?



This is not a monstrous tractor moving through a high stubble field, but two water wheels that motorize a refrigeration plant in the heart of Alexander County, N. C. Water from Davis Creek generates power for the Hiddenite Ice and Cold Storage Company on the site of old Sulphur Springs Roller Mill. Nearby was the location of Davis Sulphur Springs' 100-room hotel, a famous resort half a century ago.

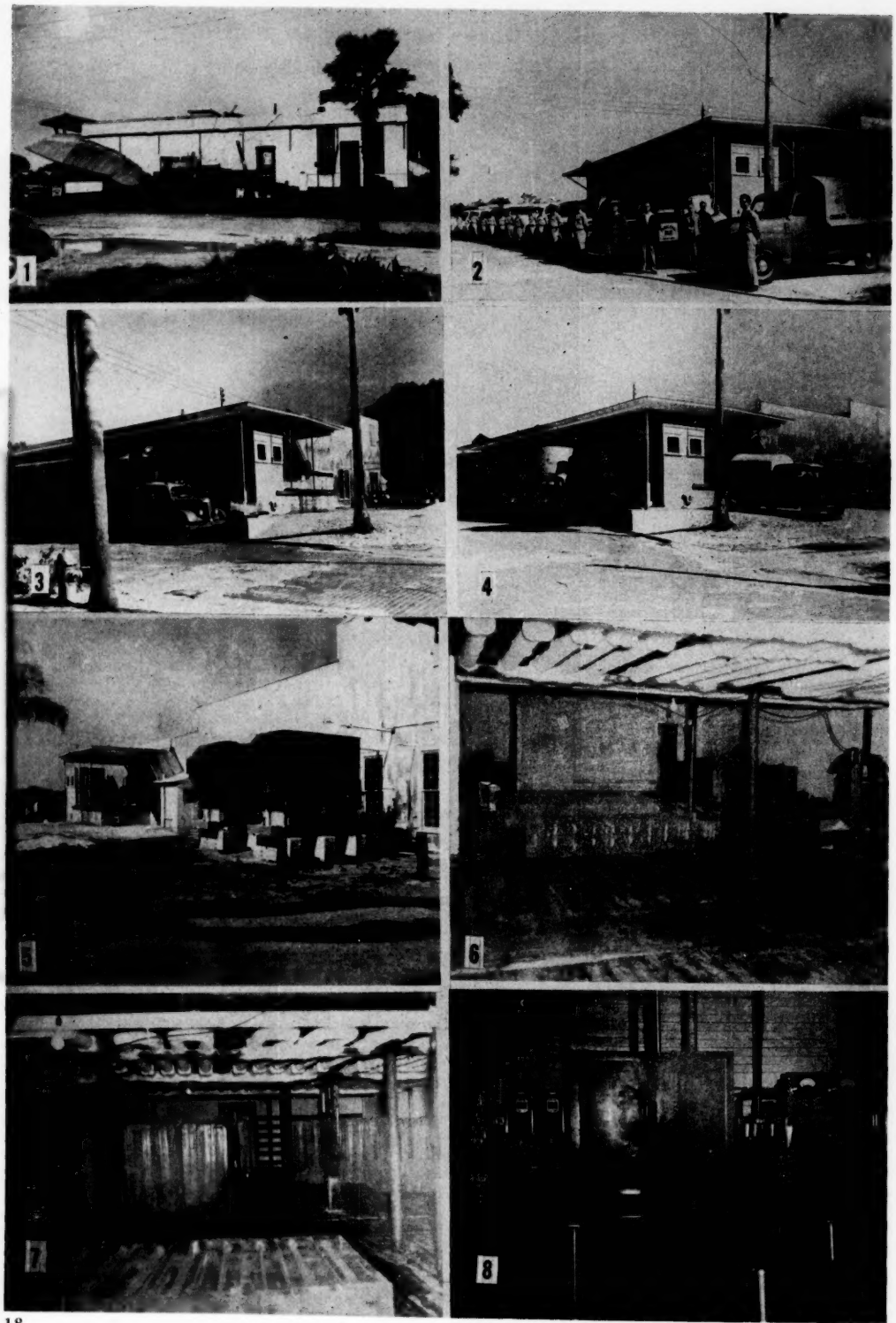
There were Cleveland Springs, Piedmont Springs near Danbury in Stokes County, then Mt. Vernon Springs (which contained that strange water, the drinking of which made one beautiful), near Siler City; Jackson Springs, and Davis Sulphur Springs near Hiddenite in Alexander County, with its 100 room hotel that burned some years ago.

All these mineral springs summer resorts with their huge hotel verandas and liveried handsoms with two spirited horses attached, have moved on to make way for the march of time. The people now go to the beach or take a weekend airplane trip. No longer does one quench his thirst and build up his morale with mineral water.

While searching out old familiar spots, where my grandmother used to take me for the summer, I ran into a somewhat unusual cold storage plant at Hiddenite. This plant is run entirely by water power. The old style water wheels were made in the modern manner of sheet steel, aluminum painted. They are approximately 26 feet in diameter and 4 feet across—a complete welding job. Enough electricity is generated to operate the cold storage plant. The water is taken from Davis Creek and the pond is a mile up stream. A private mill race that was dug in 1842 to run the old Davis Sulphur Springs Roller Mill is still in use. Once people went to the mill here and had their wheat and corn ground entirely by water power.

Here ice is made for the surrounding community. An apple room, 51 by 61 feet in size with the walls 29 inches thick, accommodates all the apples raised on the surrounding hills. The freezer locker room contains 150 private lockers for the farmers who no longer have to salt down their meat, but merely place it in their individual lockers and keep it in a frozen condition. This goes for other things too, such as game, fish, fruits and vegetables. There are a number of smaller rooms, the chill rooms, the curing room, the processing room, and a chicken room where fowls can be cleaned and dressed and placed in the lockers for future use or sale.

Through these varied facilities the community is furnished complete refrigeration service. The fact that the Hiddenite plant is completely driven by water power makes it rather unique among operations of this type.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MODERNIZATION PAYS OFF

Thorough engineering check-up and adequate cost accounting put this plant on right side of ledger. Changes brought tonnage up and power costs down.

OPERATING an ice plant was a new experience for Joe R. Gramling, president of the Arctic Ice Co., Plant City, Fla., when he assumed the management of the property. Prior to that time he had held positions as a salesman for a tractor company, and, as a graduate forester, had worked with the Florida Forest Service for ten years.

The Arctic Ice Co. was built twenty-five years ago by the late J. B. Porter and Don Walden. It pulled ice for the first time in February 1926. Subsequently Mr. Porter, the father-in-law of Mr. Gramling, purchased the interest of Mr. Walden and operated the plant until his death in 1943. For the following three years the plant was managed by an administrator of the estate, when Mr. Gramling and his wife secured the plant in July, 1946. The plant is an Arctic-Pownall system rated at 32 tons capacity.

While operating an ice plant was entirely foreign to Mr. Gramling, he set about to learn its principle of operation and more important, its cost of producing ice. He soon learned that the plant personnel had little, if any, more knowledge than he regarding its operation. No cost or production records of past years were available. He did find out, however, that the best the plant could do when pushed was about 90 percent of its rated capacity, and this at a prohibitive power cost. It was at this point that Mr. Gramling obtained advice from friendly ice manufacturers in the area. As a starter towards better plant efficiency, they recommended a thorough cleaning of the brine tanks which had not been done in the previous twenty years. Accordingly the plant closed down for two weeks to do this work. This first step succeeded in bringing production to the rated capacity of the plant but power costs still remained high.

After a further study of existing conditions, Mr. Gramling realized it was time to do something if the plant was to be placed on a profitable basis. Accordingly the company was incorporated and Hugh D'Anna, experienced in management problems, became vice president of the new corporation. At the same time a certified public accountant was employed to set up a cost accounting system. With these moves as a starter, Mr. Gramling employed a plant superintendent and defined job responsibilities for all personnel from route salesmen to car-icing foreman.

Audit Shows Cost Figures

With an experience factor of six months' operation under this revised set-up, an audit provided current cost figures. In Mr. Gramling's own words, the results were "frightening." It was at this point that C. T. Baker, Atlanta, Ga., a consulting refrigeration engineer, was employed to make a plant analysis and recommendations. In his preliminary survey, Mr. Baker pointed out the lack of thermometers so necessary for good operation. The strainers in the Arctic Pownall 9x13½ in. horizontal compressor were 60 percent restricted and the operator frankly admitted that he had no knowledge of strainers in the system. The plant was then manufacturing ice at approximately 90 kw per ton and sometimes even higher. The power cost to pump water for the roof sprays was equally prohibitive. Additional compressors and auxiliary equipment had been installed over a period of years without proper additional wiring so that the wiring system was inadequate. The switchboard was obsolete and a hazard. The only safety valve in the plant was inoperative. These are but a few of the many items that the consulting engineer uncovered in his preliminary survey.

Mr. Baker spent the next five days supervising production methods, instructing personnel, and recommended the installation of evaporative type condensers which were immediately installed. This change reduced the power demand some 15 hp with resultant lower head pressures.

Mr. Gramling pays high tribute to the work of the Florida Ice Associa-

(Continued on page 52)

The Story in Pictures (See Opposite Page)

Showing views in and around plant of Arctic Ice Co., Plant City, Fla.

1—General layout of the plant prior to remodeling. A gentle Florida "zephyr" in August, 1949 was responsible for the damage shown. The entire top was cracked horizontally and there were two perpendicular cracks over the door and right corner.

2—The personnel, including office, plant, routemen and car-icing crew. The entire truck fleet has been replaced since 1946. Wood truck bodies were replaced by all steel and are lined with three ply plywood.

3 and 4—The general layout after remodeling in early 1950. Note top icing and front bunker icing of vegetable transport trucks. The loader is the company's own design.

5—West side of the plant with the fine type condensers, receivers and platform for the route trucks. Ice for the car crew goes out a door on the east side.

6—Old office converted to ice storage. Present office is across the street. This provided about one-third more floor space but with rearrangement allows about 40 percent more storage. There is a small partitioned storage for customer's convenience. An elevator, screens and bins are on order for the sizing of ice, 6 in. cork floor, 4 in. walls and ceiling.

7—Original storage with door in east side for servicing car-icing trucks. The ice blocks are 400 lbs. All walls were reinsulated with 4 in. cork board.

8—New switchboard which controls all operations. The entire plant has been rewired.

THE ICE INDUSTRY

NATIONAL ASSOCIATION OF ICE INDUSTRIES

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Wm. J. Ayers, Memphis, Tenn.

Treasurer
Geo. Steers, Jr., Kalamazoo, Mich.

THIS MONTH IN BRIEF

The annual ice convention to be held in Chicago October 31 through November 3 will present a flexible program adaptable to changing conditions.

Experiences in teaching mechanical refrigerator owners the advantages of buying processed ice through vending stations are told by two Eastern ice distributors. These articles, also one on a survey on how to select a site for a new vending station will be of value to all ice men interested in selling more ice.

A food store survey in Akron, Ohio shows that poultry icing offers a big market for processed ice. Another related market is offered by poultry processors.

Good wall construction and quick work by the local fire department confined loss by fire in an Asheville, N. C. ice and storage plant to an unused storage section. An unusual explosion picture is shown.

The Canadian Association of Ice Industries has prepared special advertising pieces for helping the sale of cubes and crushed ice. The sized ice business is growing everywhere, but to obtain a profitable volume selling efforts are necessary.

Ice Convention Tuned to New Conditions and Times

Sherman Hotel, Chicago, Ill.

A FLEXIBLE program that can be adapted to the current rapidly changing conditions is being planned for the 33rd annual convention of the National Association of Ice Industries. Time and place for the 1950 gathering have been announced as October 31 through November 3 at the Sherman Hotel in Chicago.

Because of the unpredictable outlook for the ice business as well as for the entire national economy, stemming from the possibility of wartime controls and wartime demand, this will be the most important convention ever held, declares a NAII spokesman. With this in mind, the program committee is hard at work arranging a schedule of speakers and activities that can be attuned to whatever situation exists.

As everyone in the industry is aware, 1950 has been a poor year for ice companies due to the nationwide prevalence of below-average temperatures during the peak sales season. But for that very reason representatives of ice companies everywhere need more than ever to attend this year's convention and absorb the helpful ideas that will be set forth.

Advance commitments by exhibitors indicate one of the most interesting and informative product displays ever presented at a NAII convention.

Exhibit hall in Sherman Hotel where displays will be shown for annual convention of National Association of Ice Industries.

Akron Surveys Market for Poultry Icing

A RECENT food store survey in Akron, Ohio proves that poultry icing is a big potential ice market. This survey, made in cooperation with Akron University shows 86 percent of grocers interested in more poultry profits. Sixty-eight percent agree that customers' buying habits can be stepped up. Stores could merchandise fresh poultry every week day instead of the present general practice of selling only or mostly on week ends. Of the poultry received by retailers, 51 percent is ice packed. Eighty seven percent of the grocers know that poultry stored and displayed on ice is a better product, and 71 percent agree that iced poultry would sell better. But only 31 percent use any ice in storage, and only 16 percent display poultry on ice. This market is ready-made, the majority of grocers know that icing of poultry is the better way of selling it, but there is need for personal contact from the ice man to get them to do it.

A similar survey of any local market, the first step in getting this business, would show the potential volume of ice that could be sold. A copy of the Akron report is available from the National Association of Ice Industries, giving procedure for conducting such a survey.

There's another related market. Only about half of the poultry processors in the country are packing poultry in ice. They can increase their sales and profits too.

Hust Forms Public Relations Firm

HURLEY G. HUST who for several years was advertising director of National Ice Advertising, has joined with Stephen R. Brooke to form a public relations and advertising firm known as Booke-Hust & Company.

Mr. Hust got his initial start in the advertising business when he was associated with the "Rein Plan" in Texas, and the National Ice Marketing Service. He then became manager of the City Ice Co., Kansas City, and resigned that job to become advertising director of National Ice Advertising. He then joined Donahue & Coe., advertising agency as an account executive, and served as vice-president of J. M. Mathes, advertising agency in New York. Offices of the new concern will be in the City National Bank Building, Houston, Tex.

Hansen Succeeds Rowland

HARRY HANSEN, formerly of St. Louis, Mo., has succeeded J. L. Rowland as president of the Fayette Ice & Coal Co., Fayette, Mo. He is a son-in-law of Mr. Rowland whose

Harry Hansen

death occurred last March. Mr. Hansen formerly was a special investigator for the Transit Casualty Company in St. Louis. He assumed his new duties July 24. J. L. Rowland Jr., is vice-president of the company and Mrs. Hugh Davis remains as secretary. Mr. Hanson said some expansion of the plant is planned and general improvements will be made in the service.

Study Sanitation of Bottled Beverage Chests

SANITATION of bottled beverage chests has interested icemen, the health people and the beverage industry. To develop information on this subject, last year the Research Department of the National Association of Ice Industries made a grant in aid to Michigan State College. Bacterial counts were made in the various types of coolers which are in common use. The College investigated wet and dry mechanical coolers, and iced units with and without a water level. Contrary to what many might believe, the iced units fared well when subjected to severe self-service conditions where each day many hands were constantly plunged into the chest. Actually results were superior to some mechanical methods.

Counts per bottle from the open drain iced case were never excessive during the entire period. They were considered satisfactory when measured by present standards applied to counts on rims of beverage glasses in commercial establishments. The results should prove useful in the event ice men are called upon to discuss proposed regulatory measures on beverage cooling in their area.

The Ice Industry

American Service Report

REPORT of the American Service Co., of Kansas City, Mo., for the first six months of the current year and the twelve months ended June 30, 1950 show that ice sales for the current six months, compared with the same period of last year, decreased $251,336 while other sales consisting of appliances, frozen foods, coal, food supplies and other miscellaneous items increased $253,639. The company is continuing to extend its operations in these other sales and a number of new areas were opened up during this period. The gross profit from this source amounted to slightly over $100,000 for the six months. In view of the fact that extremely unfavorable ice weather prevailed throughout the territory during April, May and June it is difficult to estimate how much of the decrease in ice sales was attributable to the increased use of mechanical refrigeration.

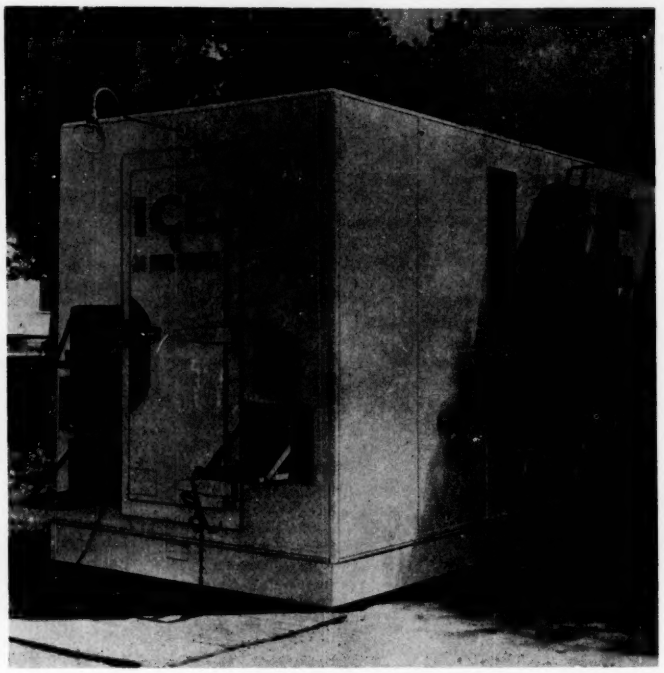
With the reduction in operating expenses of $54,000 during the current six months, as compared to the same period for the previous year, and adjusting federal income taxes to the current earnings for the period, the loss was $66,674 as compared to a profit of $20,659 for the six months ended June 30, 1949. However, included in the profit for the six months period of 1949 was a gain of $15,271 resulting from the liquidation and merger of a wholly owned subsidiary, a non-recurring item, the elimination of which for comparative purposes would reduce the profit for that period from $20,659 to $5,388.

The balance sheet at June 30, 1950 reflects a current asset to current liability ratio of approximately 2.7 to 1 as compared to 2.5 to 1 for June 30, 1949.

Merchants Ice Elects Stecker President

GILBERT J. STECKER, who has been auditor of the American Creosoting Company the past five years, has been elected president of the Merchants Ice & Cold Storage Company and of the Arctic Ice Company, Louisville, Ky. He succeeds Laurence W. Breed, who was made chairman of the board of directors of both companies. Both companies have the same officers and directors. Before going with the American Creosoting Company, he was with Trans World Airline in Kansas City about five years.

MAKING GOOD ICE CUSTOMERS OF



Two Eastern ice distributors relate their experience in teaching the mechanical user to use processed ice. Automatic ice vending stations, in strategic locations make it easy for the customer to buy ice. Here is presented factual information that will be valuable to all ice merchandisers.

O. ASHBY REARDON
Mutual Ice Company, Alexandria, Va.

IN OUR desire to place our first automatic vending station to best advantage, we were guided by three location formulas: First, should be in near proximity to an apartment-house area or a highly congested residential area. (We have two such large developments very close to our box.) Second, locate in or near a large shopping center or a large filling station at a prominent crossroads. (The vending machine is located on the fringe of a large shopping center and is directly across the road from two large filling stations.) Third, place on one or more arterial highways. (Our location is also at the junction of two main highways leaving the City of Alexandria in a westerly direction.) Our automatic vendor is located about 2½ miles from our plant.

This station has been in service continuously since June, 1948, and is situated on the property of a grocery store adjacent to a large shopping center which serves approximately 7,000 people. It is located just outside the city limits of Alexandria.

We contracted with the storekeeper for rent of the necessary ground including parking space for four or five automobiles. In his part of the agreement, the grocer agrees to keep the racks filled (except on Sunday afternoon and legal holidays); phone us whenever ice is needed in the box and/or for service; and, keep the area around the station neat and tidy. In return, we pay him 20 percent of the gross sales —less any shortages and power and light costs. This arrangement yielded this groceryman nearly $600 in 1949 with very little effort on his part. Both of us are highly pleased with the arrangement!

When the station was first installed, we had a small flood light shining on the front of the box. Last summer we added a 4-foot neon sign on the roof of the station with the word ICE in large blue letters and a long arrow in white pointing to the word OPEN which is also in blue lettering. This sign has greatly increased the sales at the station. Our best sales there are on Saturday night and Sunday.

At the present time we are only vending a 25-lb. piece of ice for 20 cents (two dimes). All the racks hold a total of 104 25-lb. pieces of ice. It is our intention to change one of the racks over to vending bags of sized ice. The station shortage of 1.3 percent is mainly caused by extra pieces of ice occasionally being delivered at one sale. This, however, is an excellent build-up of good-will, and the advertising that results from such mistakes is worth far more than the value of the ice. Occasionally, a badly cut block of ice will cause jamming of the machine.

We found a total of nine slugs deposited in our coin box last year and a few bad dimes. We only re-

(Continued on page 25)

These papers were presented at the annual convention of the Eastern States Ice Association.

MECHANICAL REFRIGERATOR OWNERS

The pictures on this and the opposite page are views of a modern ice vending station interior and exterior. Ice distributors who have tried them believe that they are here permanently. Customers like them because they can get ice when they want it and in the quantity desired.

H. STEWART DUNN
Consolidated Ice Company, Pittsburgh, Pa.

WHEN I became president of the Consolidated Ice Company in July 1946, I found that we had developed in the previous four or five years a daily demand for ice in small quantities to individual customers. Also, we had many calls for special deliveries late in the afternoon or evening which, at the high cost of labor today, was impossible to make. In most cases, these people had mechanical refrigeration and wanted ice to make ice cream, for parties, weddings, or other celebrations. Like most companies, after the first of October or November most of our plants were closed and although we were open until five o'clock, we kept no platform employees after that time.

During the holiday season in 1946, we found that the demand at our Mt. Lebanon Plant was continuing during the week and we kept a man on the platform until nine o'clock between Christmas and New Year. During the summer months the following year, we made arrangements with the night operating engineer to handle the ice sales. This was very unsatisfactory, however, as we had no adequate check on the amount of sales and had to depend entirely upon the honesty of the individual.

In June, 1948 we installed a vending station on company owned property at Saw Mill Run Blvd. at the Traffic Circle intersection with Banksville Rd. To give you a word description of this area, there is probably no residents within half a mile in either direction, there is no shopping district in this area and there is a high traffic route leading from downtown district to West End, Brookline, Dormont and Mt. Lebanon in the southern part of Allegheny County.

Three Venders Installed

We installed in this station three venders, two for 25 lb. pieces of block ice and one for 50 lb. pieces. From June 22, to December 31, 1948, we sold a total of $2,730. We found the 50 lb. pieces were not selling as it seemed to be too much weight to carry, especially for women so we took it out and put in a 10 lb. cube vender. During 1949 this same station sales amounted to $7,236.

We then decided to purchase for our Mt. Lebanon plant which is located in a highly developed residential area with practically 90 percent mechanical equipment. We installed a 25 lb. block and a 10 lb. cube vender on the platform of this plant. During 1949 the total sales amounted to $5,634, $3,031.50 for block ice and $2,603 for cubes. This was a substantial increase over the platform sales in previous years because the customer could buy the ice when and as needed.

Our next location was in the Borough of Millvale in June, 1949. This is on one of the traffic routes and street car routes in Millvale leading to North Boroughs of Allegheny County. It has not as yet developed into as good a location as the other two but we hope during the coming season, it will be further developed.

The ice sales amounted to over $2,000 in the six months of 1949.

The next location was on Route 51 leading south from Pittsburgh to Union-town in the borough of Whitehall. This has traffic passing it probably five times greater than the location at Banksville Rd. and a large area for suburban people passing on their way home. This station was not opened until the last of September, 1949.

The next station was erected in the Squirrel Hill district at Forward & Murray Ave. in the City of Pittsburgh. This is at the intersection of two main traffic highways and within a half mile of interchange on the new Penn-Lincoln Parkway passing through the City of Pittsburgh. It is in a business shopping district and surrounded by a large residential area which is probably entirely mechanically refrigerated. There are numerous apartment buildings in this area and the people can afford to spend money on parties and need the ice for serving drinks. It is one of the best advertised locations in the City of Pittsburgh and it has caused more comments and inquiries than any of our stations. This station is equipped with four venders—two for 25 lb. pieces of block ice and two for 10 lb. packages of cubed ice.

Our resume of the above stations will show that Mt. Lebanon and Squirrel Hill will probably result in large proportion of sales being cubes. However, at the other stations cube sales are increasing each week. The sales at the vending stations are small in tonnage but large in dollars and cents as the price per ton of ice averages between $28 and $41 per ton. The customers will pay the price because they buy it only when and as they need it. We have had no complaints on the price. Incidentally, we charge 1 cent per pound for block ice and 5 cents per pound for cubes.

Leasing Arrangements

As stated, two of our vending operations are on company property and the other three are leased. Term of lease is five years with option to renew, providing the owner still holds legal title to the property. The company pays for the station installation, any electrical service required and power consumed. We pay a base rental of $30 per month and until the gross sales of the station amounts to $15,000, we pay 10 percent of the gross sale as rent with credit of the $30 paid as monthly rent.

We have contacted several oil companies in the Pittsburgh district in an effort to make arrangements for leasing space around their service stations but we found that the policy of these companies was uniform in that they did not want to give more than one year's lease and that subject to 30 or 60 day cancellation notice by either party. As it costs about $350 to install and equip the station, we felt we could not gamble on less than a five year location under a firm lease.

Our stations are so located that they can be serviced in the three areas supplied by our divisions. They are checked daily by the Superintendent in each territory and the money is picked up and reported by him daily.

Package Problems

I was told that in some localities the block ice was wrapped and tied with twine. This looked to me as an expensive proposition and wasteful. When be began to operate our first station, we purchased heavy twine and wrapped it around the piece of ice thinking it would assist the customers in lifting the block. However, we found that the twine froze to the adjoining piece on the vender and in some cases caused failure of the operation. We removed the twine and provided a daily supply on the outside of the station for those who wanted to use it until our supply was exhausted and then we discontinued this practice entirely.

We found there was a demand for cubes at these stations and we studied this in order to obtain a proper package for the dispenser. The paper company who furnished our larger bags submitted various samples until we found a bag that would hold approximately 100 cubes weighing 10 lbs. or more and would fit the vender. Our first bags had wire ties but we found they did not work satisfactorily. The ties were too flexible to hold the heavy paper and would fly open. We were forced to reinforce the ties with heavy rubber bands, therefore, on our following order we eliminated the ties. These bags are made of 50 lb. wet strength paper, water repellent, provide an attractive package and are firm enough to enable the customer to take it home safely and keep it for several hours.

The operation cost has been primarily the rent and the power. The power both for lighting on the outside of the station and the refrigerating unit does not exceed at each station $25 per month. The temperatures in the stations have been excellent and we usually keep on hand in each station about six blocks of ice and about 100 additional packages of ice cubes except in the summer on Saturdays and Sundays when we fill the stations to capacity.

Our vending stations are two types—front loaders and rear loaders—depending on the accessibility of the station. We have installed on three locations Neon Signs and believe that they have helped to increase sales.

On complaints received due to failure of equipment at the vending stations, we have adopted a policy not to make cash refunds but to authorize the customer by letter to receive ice equal to the amount of his deposit at any of our plants. Fortunately, we have not had more than 12 complaints.

In reviewing our vending station operation, in spite of the fact that 1949 was a poor year generally in the ice business, our increased sales at the first two locations opened, sustain my belief in the profitable operation of vending stations. I know that most of the customers come between four and eight in the evening and the volume of sales is greater on Friday, Saturday and Sunday than the other days of the week.

Reactions from Customers

I have made a practice during the past year of interviewing customers that I met at the vending stations in order to get information as to use of the station. My first question usually was: How did you know of the station? The purpose was to see the effect of advertising in local community papers or publications we felt would be read in a certain area. Sorry to say, very few gave me this method as their source of information. Usually, they had attended a party at someone's home, saw the real ice cubes and asked where they could be purchased.

I also found that many people did not understand what was meant by "automatic". Their interpretation was that ice was made and packaged in the vending station. This made us change from using the word "Automatic" to "Serve Yourself" stations. Also, we found that the customers would get confused in putting the money in the slots. That is, when they wanted ice cubes,

they would put one quarter into each slot instead of putting two quarters into the same slot. Our machines are operated on one quarter for block ice and two quarters for a package of cubes.

We also tried advertising by radio spot announcements. This is good but rather expensive. During the Christmas Season of 1949, we carried the locations inserted in the Pittsburgh daily newspaper. This is also expensive but we felt since we had the five stations, it would be better to advertise by this method than by radio. Our holiday sales showed an increase over previous years.

Another question I like to ask at the stations or anywhere else—I call it the $64 question—"How are the iceman's cubes made?" A large majority of the people are of the opinion that we, in the ice industry, freeze them in cube trays similar to the domestic refrigerator. It is really amazing to see the expression on their faces when I explain how we make them and give the reason why our ice cubes last longer.

I am of the opinion that vending station operation is here permanently and there are certain fundamental principles with which each station must comply with: (1) Good location where station is visible to all who pass and preferably near a good shopping district; (2) the station, in addition to painted signs, needs a Neon Sign with blinking lights to catch the attention of passing automobiles; (3) adequate space for customers to stop nearby.

Further, I believe that the public likes mechanical gadgets and the idea of putting a quarter in a slot and getting a piece of ice appeals to their imagination and curiosity. Also, they do not have to order or take the ice in advance of their need.

Ice Vending

(Continued from page 22)

ceived one complaint and it was voiced by a customer who failed to get the piece of ice he paid for. The station is located in a well-traveled and well-populated area and vandalism is practically nil.

To defrost the coils easily, we fashioned a small gadget out of copper pipe. It is shaped very much like a shepherd's crook and the bend in it is just slightly larger than the size of the refrigerating coils. We simply hook the crook on the coil and pull it from one end to the other, thereby removing practicaly all of the snow in a very short time with one easy operation.

For defrosting the belt, we designed a tool shaped like a beveled school ruler, only somewhat larger, to permit the small particles of ice to glide on. It is these small particles of ice that, if permitted to gather under the belt, will hamper in operation.

For loading the station, we remove the top 50 lbs. from all blocks of ice when loading them at the plant. As all our ice is scored, this is a very easy and quick operation consisting of two sharp stabs with an ice pick while the block is in motion. These pieces of ice removed from the block are readily sold at our platform without any loss.

We do not fill our storage space to capacity. We leave a small aisle on either side of the full blocks of ice stored in the center of the station in order that we may quickly gain access to all parts of the box in event of some mechanical hang-up.

We have had the usual amount of service and upkeep on the automatic station. But the operating expenses show this cost to be very low.

REPORT ON STATION NO. 9 FOR CALENDAR YEAR 1949

Total cost installed $4,155.95

	Pounds	Dollars	Per Cwt.	Per-cent
Ice to Station	372775			100
Shortage	5200			1.3
Net Ice Sold	367575		.80	98.7
Cash Received		$2940.60	.7888	100
OPERATING EXPENSES				
Light & Power		$ 208.50	.0559	7.09
Rent		546.39	.1466	18.58
Depreciation		244.90	.0657	8.32
Hauling, Defrosting Repairs		222.39	.0597	7.56
Total Operating Cost		$1222.18	.3279	41.56
Gross Operating Profit		$1718.42	.4609	58.44

How to Select Sites for Vending Stations

HOW to select sites for ice vending stations is the objective of a new research project sponsored by the Research Department of the National Association of Ice Industries with the cooperation of three vending machine manufacturers. The F. B. Dickinson Company, Des Moines, Iowa; S & S Vending Machine Company, San Jose, Calif.; and the Thermo Cuber Company, Chicago, Ill., are cooperating with the Association in underwriting the cost.

With the increased use of vending stations in the distribution of ice, the Research Committee has become keenly interested in the limited amount of information available for guidance of ice men in locating these stations. Experienced operators are not in accord on what constitutes a good site. Some look for this and some look for that, but the trial and error method has and is continuing to play a prominent role in choosing locations. Ice men often admit, perhaps not proudly, that a location which was considered excellent turned out to be disappointing while another which was questionable from the start became outstanding. Too often, it has been necessary to cancel leases and move a station from one place to another before finding a profitable spot for it. Even where vendors are considered to be operating on a satisfactory level, some units may have many times the take of others. A shift from one point to another may well mean not only the difference between loss and profit but the difference between meager and substantial returns.

Manufacturers of vending equipment who advise ice men in placing stations do not always agree on the essentials of a good location. Such divergence of opinion, of course, is costly in outlay of cash and loss of ice business. The fact that oil, food, drug and other chains have been very successful in selecting sites for their retail outlets prompted the Research Department and the manufacturers of vending stations to pool their resources and employ competent people to conduct a study to develop the basic facts on location of these units. It was felt that such a project would result in great savings to the ice industry, more efficient use of vending stations in serving the industry's present customers, and more extensive use of vendors in reaching new potential ice customers.

The project is under the able direction of Dr. O. E. Burley, Professor of Marketing, Wharton School of Commerce, University of Pennsylvania.

The field work is now in progress. Ice companies with vending stations in a number of the nation's ice markets have thrown open their books, turned over their records and made their facilities available for detailed examination and study. The project will be completed in a few months and the report on it should be ready before the end of the current year.

The Ice Industry

City Products Earnings

EARNINGS in excess of $2,000,000 for the first six month period of 1950 are reported by City Products Corp., Chicago, Ill. William J. Sinek, president, announced that the net income of the Corporation amounted to $2,009,325, or $1.60 per share, compared to $2,192,757, or $1.74 per share for the same period last year. The small decline in earnings is due in part to unseasonable weather and to railroad and coal strikes. Current position continues strong with cash in excess of $8,600,000.

The company continues its program of expansion and diversification by acquiring dairy properties in Louisiana and Texas during the last few months. Other diversified acquisitions are under consideration at the present time.

Plant Construction and Effective Work Reduce Fire Damage in Ice Plant

A SPECTACULAR fire damaged the plant of the Asheville (N.C.) Ice and Storage Co. plant but the wall construction and the good work of the local fire department confined the loss to an unused storage section of the plant. The storage room was covered by a wood and asphalt roof which burned off. The remainder of the plant had a heavy concrete ceiling which was credited with saving that portion of it.

When the fire was discovered the ammonia lines connecting the various sections of the plant were quickly shut off. The plant was shut down for less than four hours and the temperature in the other storage rooms, some of them freezers, were held without any noticeable rise. Ice manufacturing was continued with little interruption according to Walter Lee, plant manager.

The fire was blamed on an asphalt warming kettle that ignited. The blaze spread to a wooden elevator shaft and rose quickly to the roof. Some of the firemen were on the roof fighting the fire when the explosion shown in the photograph occurred but all got away safely and continued their efforts from other points. The fire was extinguished in a reasonably short time thereafter. Damage was estimated at 30 thousand dollars.

When flames broke through the roof of the Asheville Ice & Storage plant, June Glenn, Jr., staff photographer, Asheville Citizen Times was at a vantage point to get the above picture of the fire, one of the most spectacular action pictures of the year.

Royal Palm Expands Service

AN ice plant is being built by the Royal Palm Ice Company in Marathon, Fla. to supplement service being rendered in the Florida Keys. "Up until a few months ago" Mr. McConnell, general manager of the Royal Palm Plant stated "it was our opinion that there was not sufficient business in the Keys to warrant building such a plant; however, since the shrimp boats have been located off of Key West, our thinking has been changed. There is some demand now for additional ice to be used in the shrimp business, and with this in mind we have decided to establish this new plant. There has been a rapid growth throughout the many Keys to the south of us and we feel that people in that area should be provided with a good supply of iceman's ice at a reasonable price. We feel that by making an installation of this kind, we will be able to provide the people there with good ice and good service."

The building will be of concrete block stucco construction and equipment installed will be sufficient to manufacture about 50 tons of ice daily. The plant will be driven with two diesel engines and the freezing equipment will be of the very latest design. Storage facilities will take care of about 100 tons of ice.

Growers Say Refrigerator Cars Are Short

LACK of a sufficient number of refrigerated railroad cars is worrying the National League of Wholesale Fresh Fruit & Vegetable Distributors, according to Warren B. Wilkes, secretary of the Niagara Frontier Food Terminal, Buffalo, N. Y. Mr. Wilkes said the national group is conferring with government officials with regard to the refrigerated car shortage, but he was not optimistic about the outcome.

"The Interstate Commerce Commission recently recommended that rail lines order 100,000 additional freight cars," he declared, "but none of these is to be a refrigerated car." Mr. Wilkes said there are 45,000 fewer refrigerated cars in the country today than there were ten years ago.

Vero Beach Iceman Honored

J. S. EARMAN, president of the Vero Beach (Fla.) Ice and Cold Storage Company was elected chairman of the Central and South Florida Flood Control District at a reorganization meeting held July 15.

This picture shows a metal clad S & S ice vending station, equipped to dispense 50-lb. blocks, 5-lb. bags of cubes and 20 lb. bags of crushed ice, located adjacent to a drive-in grocery and market. An ice pick dispensing machine is an integral part of the front loading door. Excellent sales have been reported.

WHY VENDING STATIONS SELL ICE

Buying habits of customers, why they buy ice from vending stations, amounts purchased, and other basic information is analyzed in this West Coast survey

JOHN W. ABERLE and EDWARD W. CUNDIFF
San Jose State College, San Jose, Calif.

A SURVEY to obtain information about ice vending customers, their buying habits and reasons for purchase, was conducted under the auspicies of San Jose State College, San Jose, Calif. under the sponsorship of the S. & S. Vending Machine Co., San Jose, Calif. In order to discuss processed ice intelligently with the average vending station customer, each interviewer was equipped with a picnic chest, in which were kept both crushed and cubed ice. In this survey, the direct customer interview was used. Interviewers were placed at 10 selected vending stations to interview all customers. Formal questionnaires were used and supplemented with additional information volunteered by the customers. Interviews were conducted on weekdays, Saturdays and Sundays so that a more nearly typical pattern could be secured.

Interviews obtained numbered 466. The results show that the typical customer is a man (383 or 88.5 per cent were men, and only 11.5 per cent were women) who buys most frequently in the late afternoon or early evening after work.

Customer Use of Ice

To the question, "For what use is the ice being purchased?" 466 answers were given as follows:

338 or 72.7 per cent—for refrigerator use.

82 or 17.4 per cent—for drinks

14 or 3. per cent—for ice cream

24 or 5.2 per cent—for picnics

8 or 1.7 per cent—for other uses—which included refrigerator breakdown, trailer, medical, and nursery use.

These figures do not represent a typical weekly percentage breakdown because the largest part of the interviews were on Saturday and Sunday. The percentage on particular days are shown in the table below:

The weighted average was computed to present a more accurate or normal picture of customers' reasons for puchase. It can be seen from the above figures that week-ends, particularly Sundays, are the periods for heaviest purchasing for parties and

	Weekday	Saturday	Sunday	Weighted Average
Refrigerator	89	80.4	47	81
Drinks	9	15.8	28	12.7
Ice Cream	1.5	1	10	2.7
Picnics	1.5	2.8	15	3.6
Other	0		0	

picnics with a consequent reduction in the percentage of purchases for refrigeration.

Frequency of Purchase

The average purchaser buys ice two or three times a week as presented in the following table:

Frequency of Purchase	No.	%
Daily	6	1.2
3 times a week	133	28.4
2 times a week	140	30.0
Weekly	63	13.4
Occasionally	75	16.6
Rarely	49	10.4
	466	100.0

The purchase pattern presented above shows that approximately three-fourths of the customers are regular users of ice (purchased weekly or more often.) However, when these figures are broken down for weekdays and week-ends as in the table below, we find that even a larger percentage of weekday purchasers are regular customers.

Only one-eighth of the customers on weekdays are irregular purchasers (occasionally or rarely.) One-third of the Saturday customers, and nearly one-half of the Sunday customers are in this group. The weighted average shows more clearly the regularity of purchase of the average customer over a week.

	Weekday	Saturday	Sunday	Weigthed Average
Daily	0	2	0	
Three times a week	34.3	30	21	31.8
Two times a week	32.9	34	16	30.7
Weekly	21.4	11	15	19.0
Occasionally	8.5	12	33	12.5
Rarely	3	11	15	6.0

Reasons for Purchasing

Of the 450 responses to this question, 326 or 72 per cent stated that they did not own an electric refrigerator. They gave the following reasons for buying at a vending machine instead of having regular home delivery:

	No.	%
More convenient	209	64.3
Not at home for delivery	37	11.1
Temporary use	26	8.0
No delivery available	24	7.4
Ran out of ice	11	3.4
Cheaper	10	3.0
Others*	9	2.8
	326	100.0

*Mostly result of dissatisfaction with delivery service offered.

In the April, 1950 issue of ICE AND REFRIGERATION the results of a survey on customer preference of ice vending station locations was published.

This survey to obtain information about people who buy ice from vending stations shows:

—their buying habits;
—what they use ice for;
—how often purchased;
—reasons for buying;
—the kind and amount of ice used;
—their interest in processed ice and time of purchase, all basic information valuable to ice distributors who operate such stations.

This shows that a clear majority of the customers, 64.3 per cent, patronize the vending machines because they prefer it to home delivery. Approximately 25 per cent buy from the machines because home delivery doesn't completely fulfill their needs. It is probable that more than the indicated 3 per cent buy from the machines to save money, but are reluctant to give that as an answer.

The 125 respondents who stated that they own an electric refrigerator gave the following reasons for buying at the particular machine indicated:

	No.	%
Closest	71	56.8
On way home	38	30.4
On way to picnic	16	12.8
	125	100.0

Type and Amount of Ice Purchased

In the stations which vended processed ice, the number of transactions involving processed ice amounted to 9.6 per cent of total ice purchased. The breakdown of purchases for these stations vending processed ice is as follows:

	Amount	%
Processed	17	9.6
Bulk— 25 lbs.	87	49.6
Bulk— 50 lbs.	69	39.2
Bulk— 75 lbs.	2	.8
Bulk—100 lbs.	2	.8
	177	100.0

In the above table purchases of 25 lb. cakes are 26 per cent greater than purchases of 50 lb. cakes. In the remaining stations which sold only bulk ice, purchases of 25 lb. cakes were 174, and 50 lb. cakes 112; in which case 25 lb. purchases are 44 per cent greater than 50 lb. purchases.

In order to determine the feasability of eliminating sale of 50 lb. cakes of ice, all 181 customers purchasing this size were asked if they would be willing to purchase two 25 lb. cakes instead, at the same price; 40 per cent answered yes, and 60 per cent answered they preferred the 50 lb. cake. The principal reasons given were: that the two small cakes would melt faster, and the single cake would fit more easily into an ice box.

Interest of Customers In Processed Ice

The customers were asked if they would be interested in purchasing processed ice, and were shown samples of both crushed and cubed ice, if they weren't familiar with these products. Of the 444 responses to this question, 141 or 31.7 per cent of the total answered yes. The remaining 303 or 68.3 per cent were not interested in processed ice.

When these figures are broken down to show separately the stations which do and do not sell processed ice, the results are changed. At the stations which already vend processed ice, 36.6 per cent of these customers indicated an interest in the product; in the other stations, only 24.8 per cent were interested. This would indicate that familiarity with the product and education are useful in developing a market for processed ice.

In San Jose approximately one-eighth of those questioned were interested in processed ice. In San Francisco, however, only about 10 per cent wanted processed ice. This difference can be partially explained by the fact that more of those interviewed in San Jose were buying for picnics, and also that the San Francisco location was not selling processed ice.

The customers who showed an interest in processed ice were asked to state their preference between crushed ice and cubes: 42.7 preferred crushed ice; 57.3 per cent preferred cubes. Those who were interested in crushed ice felt that the existing price was satisfactory.

(Continued on page 52)

Reports from Unit Ice Associations

Canadian Association of Ice Industries

MRS. MILDRED CROFT, Secretary

A PREVIOUS report from Canada stated that the ice tonnage for the first five months of 1950 was equal to the first five months of 1949. The months of June and July and the first two weeks of August have shown a decline in tonnage due to the particularly cool weather. This seems to be general for pretty well all of Canada and it is the first summer in many years that there is a surplus of Ice in every section of the country.

The decrease in sales does not seem to be particularly heavy in any one branch of the business. That is to say that the domestic tonnage is not down to any greater degree than say car icing tonnage. It seems that there is a general decrease in all branches of ice merchandising. Most companies, however, find that they are enjoying a better tonnage than 1948 and this fact is certainly reassuring to the members of the ice industry.

A number of ice dealers have introduced the rental plan on refrigerators and the results are very satisfactory. There are a great many high class refrigerators being placed in customer's homes because of the rental plan.

As far as vegetable icing is concerned, we have been more than pleased with the number of installations made in grocery and fruit stores and the prospect for increased tonnage in this field is encouraging.

Heavy rain during the morning of June 29 did not dampen the ardor of golfing icemen who entered the association's annual tournament, held this year at the beautiful Westmount Golf and Country Club in Kitchener. Noontime brought sunshine and clear skies for the happy event. At a really sumptuous dinner in the evening presided over by L. G. Wilkins, presentation of the handsome Blue Top Trophy was made to H. B. McNulty of St. Catherines for the best low net. Eleven others shared in the prizes.

Preparations for the 1950 annual convention to be held at Quebec City in November are proceeding in "high gear" as committee members finish arrangements for accommodations, exhibits, transportation, entertainment and program. It is difficult to conceive a more enchanting setting for the annual get-together than the Chateau Frontenac. Already many ice dealers have said they have made all plans to be present.

Northwest Association of Ice Industries

ED H. SHEA, Executive Secretary

THE midseason meeting of the Northwest Association of Ice Industries was held as scheduled July 21 at Hoquiam, Wash. It was quite well attended by association members and visitors.

The purpose of the meeting was a general discussion of the retail ice problems of present day markets. Each one present was called on by the chairman to speak in relation to the subject under discussion as it came before the meeting. The subjects included plans for merchandising and advertising; sales policy to combat mechanical refrigeration in the homes of domestic ice consumers; sales to taverns, restaurants, and hotels; service to mechanical refrigerator owners in private homes and comercial consumers where ice could be used; sales and rentals of domestic refrigerators; vegetable display cases, sales and rentals; vending machine locations and operation; package sales of ice in various sizes. The open discussion of these subjects together with incidental topics, which were entirely local, made the meeting very instructive, interesting, and educational to all who attended.

The committee to formulate and complete plans for a Field School in the Northwest in conjunction with the National Marketing Institute as promoted by the National Association was instructed to make a detailed report at the next general meeting to be held in October.

The summer season arrived in the Northwest the middle of June and domestic ice business has been better than expected.

Ohio State Fair Ice Exhibit

THE Ohio Association of Ice Industries again had an exhibit at the State Fair at Columbus, Ohio, August 26 to September 1. The ice exhibit was located, as usual, in the Columbus Building. An interesting and attractive display was presented to the thousands of people who were there from all over the State of Ohio. Members of the ice industry in particular were interested in inspecting this exhibit and many of them found it worthwhile to call the attention of friends and acquaintances who planned to attend, to the fact that the Ohio Ice Association was an active participant in the big event.

Canadian Advertising Extends Ice Markets

FOR ice distributors who are devoting more and more of their sales thinking to the widening market for cubes and crushed ice the Canadian Association of Ice Industries has prepared special sales pieces which are available now.

For produce merchants the bulletin "Ice Displays—Promoter of Produce Profits," is for use in connection with personal contact and for mailing to food stores. It promotes the use of crushed ice for vegetables, fruit, fish and poultry.

For restaurants and hotels, the bulletin "Genuine Ice—Promoter of Profits," gives a strong selling tool for developing this trade. In the case of restaurants and hotels, and also food stores, a continuing sales program of personal contacts, telephone calls and mailings are essential to develop adequate interest.

For householders, the smart little folder, "Genuine crystal-clear Ice" can be used for general distribution to all homes, whether they use ice or mechanical refrigeration.

A modest use of newspaper space will do a good job with a series of small but powerful newspaper advertisements. Seven mats are provided, which may be clipped when ordering space.

An association bulletin describing this material points out that the sized ice business is growing everywhere, but in order to obtain a profitable volume on this business, strong selling efforts are necessary. The business is there; it is simply a question of going after it.

New England Ice Association

RAYMOND T. WILBER, Secretary

THE secretary of the New England Ice Association has accepted a position as executive vice-president of the Rhode Island Ice Co., and the board of directors has voted that the association office be moved to 83 Winter Street, Providence, R. I. The association's activities will be carried on by the secretary, with the help of a full-time assistant.

The board of directors at a recent meeting arranged to hold an outing this year. Lake Pearl has been suggested, but no definite plans have been made. The date, place, and other details will be announced later.

The Ice Industry

Study Methods of Handling and Marketing Sweet Corn

STUDIES of more effective methods of handling and marketing sweet corn are being made by the Research Department of the National Association of Ice Industries in cooperation with Unit ice association in Indiana and Ohio. Both projects are aimed at improved procedures of marketing crops which are grown and consumed locally, and are conducted by Purdue and Ohio State, respectively. Emphasis is being placed on containers and on icing the product all the way from field to consumer. Among other things, a unique method of packaging is being tried. The wet strength paper bag is being tested as a container for both the corn and refrigeration. Corn and crushed ice are being placed in the bag in the field. In addition to instant cooling which is mandatory for protection of quality, it is believed that this type of container through exclusion of air currents plus its insulating value will provide better temperatures. Furthermore, it is easy to handle, and the refrigeration is not lost in the wholesale market or chain store warehouse where lots are divided for shipment to retail stores. The results will be reported later.

Icing Sweet Corn In Indiana

FOR the first time a new method of icing sweet corn is being used by two growers in Flat Rock, Ind. The new method involves the precooling of freshly picked sweet corn in an ice water bath. Moving on a conveyor system in a concrete tank through ice water, the corn is cooled more rapidly and with a great deal more efficiency than with previous methods of field icing.

"Screened" Ice Plant Suit

A SUIT charging infringement of Patent No. 2,118,796 has been filed against several ice companies, equipment manufacturers and individuals by Kelvin T. Orrison, Frank G. Jennings and John Boyle who claim their patent broadly covers the processing of screened ice in its various sizes. The first suit against an eastern ice manufacturer is scheduled for hearing the latter part of September.

Florida Ice Association

MURIEL WASHBURN, Secretary

THE 25th annual convention of the Florida Ice Association will be held at the Columbus Hotel, Miami, Fla., Monday and Tuesday, October 9 and 10, 1950. Besides the swaying palms 'neath a mellow moon, rippling waves and bathing beauties, of which Miami not only boasts but also can produce, the Florida Ice Association and Miami ice men have gone into a huddle and intend to make this Florida's outstanding convention from an entertainment standpoint. Miami has the background and talent for just that, according to a Florida Ice Association bulletin.

All thought and effort is not being devoted to the lighter side of this annual meeting, however—and speakers, outstanding in their field, will make the business sessions something Florida ice men cannot afford to miss. A panel on ice men's everyday problems, in which all may participate, will also be a feature of the meeting.

All Florida ice men, and those in adjoining states are invited to make their plans to arrive in Miami on Sunday afternoon, October 8, and attend the first business session at 9:30 Monday morning, October 9. Men who are authorities will be on hand to tell how to increase profits and give a Washington view-point on world and national events. A post-Convention trip to Havana and Nassau is being planned.

Delta States Ice Association

SPECIAL committees of the Delta States Ice Association met in Little Rock on August 10 to formulate plans for the annual convention which will be held at Little Rock, November 13-15. The Delta States Association representing Arkansas, Louisiana and Mississippi, annually holds its convention in the state from which its president is elected. R. H. Hunter of Paragould is the present presiding officer.

Icing Fresh Meat Mechanical Cases

AN EASTERN ice company started developing an icing service for mechanical meat case owners in 1933 and now has 1,500 feet of this business in the city's largest market. One 72-ft. case averages 5,450 lbs. of ice the year 'round. Another 140-ft., case averages 8,300 lbs., per week, and one with window display and a 135-ft. case uses 10,000 lbs. of ice each week.

Illinois Association of Ice Industries

W. D. WRIGHT, Secretary

TONNAGE sales in Illinois are very disappointing this year, due largely to the low temperatures prevailing, secondly, loss to competition. Since the war scare there has been quite a rush to buy other types of refrigeration, in the belief that rigid controls would make them impossible to obtain later. Naturally, industry is disturbed, not knowing what the future may bring in regulations and manpower. Employment has been and still is high which is a condition much different than was present at start of World War II. Shortage of civilian manpower will be much worse by the end of the year and since the defense program is on world war scale rather than Korea only, it is reasonable to expect drastic changes in our economy. Time will clarify the situation which is muddled at present.

A copy of the film, "Naturally Yours" purchased by the Association has been placed on a permanent loan basis with the Illinois Film Bureau, 214 Broadway, Springfield, Ill., thus making it available to schools, churches, universities, groups and ice men at the cost of transportation only. We believe this will result favorably to our members and the industry.

Field School in California

ARRANGEMENTS have been made with the Personnel Training and Marketing Department of the National Association of Ice Industries by the California Association of Ice Industries to conduct a Marketing Institute Field School during November 13-18, 1950 in California. The location of the school will be announced later.

Beer Sales by Ice Plants Legalized in Austin, Tex.

ICE plants in certain commercial zones of Austin, Tex. may soon be allowed to sell packaged beer for off-premise consumption if an amendment to the city's zoning ordinance is approved. Drawing up of the amendment was ordered recently by the City Council and August 31 was set for a public hearing on it.

The amendment would change the requirements on Class C-1 commercial zones which now allow sale of beer with food in bona fide restaurants but prohibit its sale for off-premise consumption. Only ice plants presently located in Class C-2 commercial zones can now sell beer for off-premise consumption.

Practical Refrigerating Engineer

NATIONAL ASSOCIATION PRACTICAL REFRIGERATING ENGINEERS

Leland Kenagy, Newton, Kans.

Sergeant-at-Arms, National Association Practical Refrigerating Engineers

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Industrial Refrigeration Safety Code

For many months an industry committee sponsored by the American Society of Refrigerating Engineers worked on the revision of the Safety Code for Mechanical Refrigeration to bring it up to date and make it reflect the ideas of the industry, users and regulatory authorities. The code which resulted has been approved by the A.S.R.E. and the American Standards Association and published as A S A B9. 1-1950.

To give examples of provisions in the new code, portions of the section on industrial plants have been extracted in this article with certain explanatory material added. The entire code has been published by the A.S.R.E. in a 20 page booklet which is obtainable from them.

Installation Requirements

8.1 Foundations and Supports for condensing units or compressor units shall be of substantial and noncombustible construction when more than 6 inches high. (See 8.3.)

8.2 Moving Machinery should be guarded in accordance with accepted safety standards.

8.3 Clear Space adequate for inspection and servicing of condensing units or compressor units shall be provided.

8.4 Condensing Units or Compressor Units with Enclosures shall be readily accessible for servicing and inspection.

8.5 Water Supply and Discharge Connections should be made in accordance with accepted safety and health standards.

8.5.1. Discharge water lines shall not be directly connected to the waste or sewer system. The waste or discharge from such equipment shall be over and above a trapped and vented plumbing fixture.

8.6 Illumination adequate for inspection and servicing of condensing units or compressor units should be provided.

8.7 Electrical Equipment and Wiring shall be installed in accordance with accepted safety standards.

8.8 Gas Fuel Devices and Equipment used with refrigerating systems shall be installed in accordance with accepted safety standards.

Machinery Room Requirements

8.11.1 Each refrigerating machinery room shall be provided with tight-fitting door or doors and have no partitions or openings that will permit the passage of escaping refrigerant to other parts of the building.

8.11.2 Each refrigerating machinery room shall be provided with means for ventilation to the outer air. The ventilation shall consist of windows or doors opening to the outer air, of the size shown in Table 5, or of mechanical means capable of removing the air from the room in accordance with Table 5. The amount of ventilation for refrigerant removal purposes shall be determined by the refrigerant content of the largest system in the machinery room.

8.11.3 Mechanical Ventilation, when used, shall consist of one or more power-driven exhaust fans, which shall be capable of removing from the refrigerating machinery room the amount of air specified in Table 5. The inlet to the fan, or fans, or air duct connection shall be located near the refrigerating equipment. The outlet from the fan, or fans, or air duct connections shall terminate outside of the building in

an approved manner. When air ducts are used either on the inlet or discharge side of the fan, or fans, they shall have an area not less than specified in Table 5. Provision should be made for the inlet of air to replace that being exhausted.

8.11.4 Class T Machinery Rooms in basements or sub-basements (see definition 2.37) shall have adequate mechanical ventilation operating continuously, which may be considered as a part of the emergency ventilation required in 8.11.2.

8.12 Air Duct Systems of air conditioning equipment for human comfort using mechanical refrigeration should be installed in accordance with accepted safety standards. (National Board of Fire Underwriters Pamphlet 90 — Air Conditioning, Warm Air Heating, Air Cooling, and Ventilating Systems, 1950 Edition, 6).

TABLE 5—MINIMUM AIR DUCT AREAS AND OPENINGS

Weight of refrigerant in system, lb.	Mechanical discharge of air, cfm	Duct area, sq. ft.	Open window or door area, sq. ft.
up to 100	400	$1\frac{1}{2}$	10
200	680	$2\frac{3}{8}$	14
400	1,100	$1\frac{1}{4}$	20
600	1,450	$1\frac{1}{2}$	24
1,000	2,050	2	31
1,500	2,500	$2\frac{1}{4}$	37
2,500	3,300	$2\frac{1}{2}$	43
5,000	5,500	$4\frac{1}{2}$	62
10,000	9,500	$6\frac{1}{2}$	90

Refrigerant Piping, Valves, Fittings, and Related Parts

9.1 General. Refrigerant piping, valves, fittings, and related parts used in construction and installation of refrigerating systems shall conform to the American Standard Code for Pressure Piping.

9.2 Metal Enclosures or Pipe Ducts for Soft Copper Tubing. Rigid or flexible metal enclosures shall be provided for soft, annealed copper tubing used for refrigerant piping erected on the premises and containing other than Group 1 refrigerants. No enclosures shall be required for connections between condensing and the nearest riser box, provided such connections do not exceed 6 feet in length.

Specific Minimum Requirements for Refrigerant Pipe and Tubing

9.3.1 Standard wall steel or wrought iron pipe may be used for design working pressures not exceeding 300 psig, provided lap-welded, electric resistance welded, or seamless pipe is used for sizes 2 inches and larger, and extra strong wall pipe is used for liquid lines for sizes $1\frac{1}{2}$ inches and smaller conforming to American Standard B36.10-1939.

9.3.2. Standard iron pipe size copper and red brass (not less than 80 percent copper) pipe and tubing may be used and shall conform to the dimensions given in Tables II and IV of ASTM Specification B188-47T.

9.3.3 Watertube size hard copper tubing used for refrigerant piping erected on the premises shall conform to ASTM Specification B88-48, Types K or L, for dimensions and specifications. Copper tubing $\frac{1}{4}$ inch and $\frac{3}{8}$ inch outside diameter having a minimum wall thickness of 0.025 inch and 0.030 inch, respectively, shall be considered as meeting the requirements for this copper tubing.

9.3.4. Soft annealed copper tubing used for refrigerant piping erected on the premises shall not be used in sizes larger than $\frac{7}{8}$ inch outside diameter ($\frac{3}{4}$ inch nominal). It shall conform to ASTM Specification B68-47, and shall have wall thicknesses not less than contained in ASTM Specification B88-48 for Type L. Copper tubing $\frac{1}{4}$ inch and $\frac{3}{8}$ inch outside diameter having a minimum wall thickness of 0.025 inch and 0.030 inch, respectively, shall be considered as meeting the requirements for this copper tubing.

9.3.5. Soldered joints on copper tubing used in refrigerating systems containing Group 2 or Group 3 refrigerants shall be made with solders or alloys having melting points not less than 1000 F. (Group 1 refrigerants include carbon dioxide, the Carrenes and Freons. Group 2 includes ammonia and methyl chloride. Group 3 includes butane and propane.)

9.4 Joints and Refrigerant-Containing Parts in Air Ducts. Joints and all refrigerant-containing parts of a refrigerating system located in an air duct of an air conditioning system for human comfort shall be constructed to withstand, without leakage, a temperature of 1000 F.

9.5 Exposure of Refrigerant Pipe Joints. Refrigerant pipe joints shall be exposed to view for visual inspection, excepting when insulated or mechanically protected, or when located in the cabinet of a unit system, or installed outside the building, or in a tight pipe duct or shaft vented to the outer air.

9.6.1 General Requirements. All systems containing more than 50 pounds of a Group 1 refrigerant or 6 pounds of a Group 2 or 3 refrigerant, other than systems utilizing nonpositive displacement compressors, shall have stop valves installed as follows:

a) Each inlet of each compressor, compressor unit, or condensing unit;

b) Each discharge outlet of each compressor, compressor unit, or condensing unit, and of each liquid receiver.

9.6.2. Systems Containing 100 Pounds or More of Refrigerant. All systems containing 100 pounds or more of a refrigerant, other than systems utilizing nonpositive displacement compressors, shall have stop valves, in addition to those in 9.6.1, on each inlet of each liquid receiver and each branch liquid and suction line except that none shall be required on the inlet of a receiver in a condensing unit nor on the inlet of a receiver which is an integral part of a condenser.

9.6.3. Stop valves used with soft annealed copper tubing or hard drawn copper tubing $\frac{3}{4}$ inch nominal size or smaller shall be securely mounted, independent of tubing fastenings or supports.

9.6.4. Stop valves shall be suitably labelled if it is not obvious what they control. Numbers may be used to label the valves provided a key to the numbers is located near the valves.

9.7 Location of Refrigerant Piping.

9.7.1 Refrigerant piping crossing an open space which afford passageway in any building shall be not less than $7\frac{1}{2}$ feet above the floor unless against the ceiling of such space.

9.7.2 Free passageway shall not be obstructed by refrigerant piping. Refrigerant piping shall not be placed in any elevator, dumbwaiter, or other shaft containing a moving object, or in any shaft which has openings to living quarters or to main exit hallways. Refrigerant piping shall not be placed in public hallways, lobbies, or stairways, except that such refrigerant piping may pass across a public hallway if there are no joints in the section in the public hallway, and provided nonferrous tubing of 1 inch nominal diameter ($1\frac{1}{8}$ inch outside diameter) and smaller be contained in a rigid metal pipe.

Design and Construction Of Equipment

10.1.1 Every part of a refrigerating system, with the exception of pressure gages and control mechanisms, shall be designed, constructed, and assembled to withstand a test pressure not less than the minimum refrigerant leak field test pressure specified in Table 6 without being stressed beyond one-third of its ultimate strength. (See 10.2.)

NOTE: This paragraph establishes a minimum design working pressure in terms of the field test pressure so that the minimum refrigerant leak field test pressure, specified in Table 6, can be safely applied. Rules governing pressure-relief devices, pressure-limiting devices, etc., shall be based on the design working pressure selected.

10.1.2 All materials used in the construction and installation of refrigerating systems shall be suitable for conveying the refrigerant used. No material shall be used that will deteriorate because of the refrigerant, or the oil, or the combination of both.

NOTE: Many refrigerants are corrosive to the usual materials when moisture or air, or both are present and it is assumed in approving these materials that the system will be charged and operated in accordance with accepted practice to prevent or minimize this corrosion.

10.1.3 Aluminum, Zinc, or Magnesium shall not be used in contact with methyl chloride in a refrigerating system. Magnesium alloys shall not be used in contact with any Freon refrigerant.

10.4.1 Pressure-limiting devices shall be provided on all systems containing more than 20 pounds of refrigerant and operating above atmospheric pressure, and on all water cooled systems so constructed that the compressor or generator is capable of producing a pressure in excess of the test pressure; except water cooled unit systems containing not more than 3 pounds of a Group 1 refrigerant, providing the system will safely relieve the refrigerant in case of failure of the water supply or providing an overload device that will stop the action of the compressor before the pressure exceeds one-fifth the ultimate strength of the system.

10.4.2 Pressure-limiting devices shall stop the action of the pressure-imposing element at a pressure not more than 90 percent of the pressure-relief device setting, or 90 percent of the refrigerant leak field test pressure actually applied, whichever is lower. (See 10.2 for minimum refrigerant leak field test pressures.)

10.4.3 Pressure-limiting devices shall be connected, with no intervening stop valves, between the pressure-imposing element and any stop valve on the discharge side.

10.5 Liquid Level Gage Glasses, except those of the bull's eye or reflex type, shall have automatic closing shut-off valves, and such glasses shall be adequately protected against injury.

10.6 Dial of a Pressure Gage, when the gage is permanently installed on the high side of a refrigerating system, shall be graduated up to approximately double the operating pressure, but in no case less than 1.2 times the design working pressure.

Relief Devices in General

12.1 General. Every refrigerating system shall be protected by a pressure-relief device unless so constructed that pressure due to fire conditions will be safely relieved by soldered joints, lead gaskets, fusible plugs, or other parts of the system.

12.1.1 No stop valve shall be located between any automatic pressure-relief device or fusible plug and the part or parts of the system protected thereby, except when the parallel relief devices mentioned in 13.2 are so arranged that only one can be rendered inoperative at a time for testing or repair purposes.

12.1.2 All pressure-relief devices shall be connected as nearly as practicable directly to the pressure vessel or other parts of the system protected thereby, above the liquid refrigerant level, and installed so that they are readily accessible for inspection and repair and so that they cannot be readily rendered inoperative. Fusible plugs may be located above or below the liquid refrigerant level.

12.1.3 The seats and discs of pressure-relief devices shall be constructed of suitable material to resist refrigerant corrosion or other chemical action caused by the refrigerant. Seats or discs of cast iron shall not be used.

12.2 Pressure-Relief Devices for Positive Displacement Compressors. Positive displacement compressors operating above 15 pounds per square inch gage and having a displacement exceeding 50 cubic feet per minute, shall be equipped by the manufacturer with a pressure-relief device of adequate size and pressure setting to prevent rupture of the compressor located between the compressor and stop valve on the discharge side. The discharge from such relief device may be vented to the atmosphere or into the low pressure side of the system.

12.3 Discharge of Pressure-Relief Devices and Fusible Plugs on all systems containing more than 6 pounds of refrigerant, other than systems containing Group 1 refrigerants in quantities less than shown in Table 1, Section 6, shall be to the outside of the building in an approved manner; pressure-relief devices may discharge into the low side of the system provided the relief devices are of a type not appreciably affected by back pressures and provided the low side of the system is equipped with relief devices vented to the outside of the building in an approved manner.

Relief Devices for Pressure Vessels

13.1 General. The rules of this section are based upon the rules given in Paragraphs UG-125 to UG-134, inclusive, of Section VIII of the 1950 Edition of the ASME Boiler Construction Code, with such additional restrictions as are necessary for control of refrigerants.

13.2 Pressure Vessels over 5 Cubic Feet. Each pressure vessel containing liquid refrigerant with internal gross volume (gross capacity) exceeding 5 cubic feet and exceeding 6-inch inside diameter, except as specified in 13.4, and which may be shut off by valves from all other parts of a refrigerating system, shall be protected by an approved pressure-relief valve in parallel with a rupture member or second approved pressure-relief valve. Each valve or rupture member shall be of sufficient capacity to prevent the pressure from rising more than 10 percent above the design working pressure. (See 12.1.1.)

13.2.1 Relief Devices in Parallel on Large Vessels. In cases where large pressure vessels containing liquid refrigerant except as specified in 13.4, require the use of two or more pressure-relief devices in parallel to obtain the capacity required by 13.5, the battery of pressure-relief devices shall be considered as a unit, and therefore as one pressure-relief device.

13.4 Relief Devices for Pressure Vessels Used as, or as Part of, Evaporator. Provisions of 13.2 and 13.2.1, which require a second parallel approved relief device, and 13.3 do not apply to pressure vessels used as, or as part of, evaporators insulated or installed in an insulated space, and which may be shut off by valves from all other parts of a refrigerating system.

13.5 Required Capacity. The minimum required rated discharge capacity of the pressure-relief device of fusible plug for a refrigerant-contain-

ing vessel shall be determined by the following formula:

$$C = f D L$$

where C = minimum required discharge capacity of the relief device in lb. of air per min.
D = outside diameter of the vessel in ft.
L = Length of vessel in ft.
f = factor dependent upon kind of refrigerant as follows:

Kind of refrigerant	value of f
Ammonia	0.5
Freon-12 and Freon-22	1.6
All other refrigerants	1.0

13.6 Pressure-Relief Device Setting. All pressure-relief devices shall be set to start to function at a pressure not to exceed the design working pressure of the vessel as determined by the manufacturer and stamped on the vessel or system.

13.7 Rupture Member Setting When Used in Parallel with Relief Valves. Rupture members used in parallel with pressure-relief valves on refrigerant-containing vessels shall function at a pressure not to exceed 20 percent above the design working pressure of the vessel.

13.8 Other Rupture Member Setting. All other rupture members used in lieu of, or in series with, a relief valve shall function at a pressure not to exceed the design working pressure of the vessel and the conditions of application shall conform to the requirements of Section VIII of the 1950 Edition of the ASME Boiler Construction Code.

13.9 Marking of Relief Devices.

13.9.1 All pressure-relief valves for refrigerant-containing vessels shall be set and sealed by the manufacturer. Each relief valve shall be marked by the manufacturer with the data required in Paragraph UG-129 (a) of Section VIII of the 1950 Edition of the ASME Boiler Construction Code.

13.9.2 Each rupture member for refrigerant-containing pressure vessels shall be marked with the information required in Paragraph UG-129 (d) of Section VIII of the 1950 Edition of the ASME Boiler Construction Code.

Field Tests

14.1 General. Every refrigerant-containing part of every system that is erected on the premises, except compressors, condensers, evaporators, safety devices, pressure gages, and control mechanisms, that are factory tested, shall be tested and proved tight after complete installation, and before operation, at not less than the minimum refrigerant leak field test pressures shown in Table 6.

14.2 Test Medium. No oxygen or any combustible gas or combustible mixture of gases shall be used within the system for testing.

14.3 Posting of Tests. A dated declaration of test should be provided for all systems containing 50 lb. or more of refrigerant, where required by 14.1. The declaration should be mounted in a frame, protected by glass, and posted in the machinery room and should give the name of the refrigerant and the field refrigerant leak test pressures applied to the high side and the low side of the system. The declaration of test should be signed by the installer and, if an inspector is present at the tests, he should also sign the declaration. When requested, copies of this declaration shall be furnished to the enforcing authority.

Instructions

15.1 Signs. Each refrigerating system erected on the premises shall be provided with an easily legible permanent sign securely attached and securely attached and easily accessible, indicating thereon the name and address of the installer, the kind and total number of pounds of refrigerant required in the system for normal operations, and the refrigerant leak field test pressure applied.

15.2 Metal Signs for Systems Containing More Than 100 Pounds of Refrigerant. Systems containing more than 100 pounds of refrigerant shall be provided with metal signs having letters not less than ½ inch in height designating the main shut-off valves to each vessel, main steam or electrical control, remote control switch, and pressure-limiting device. On all exposed high pressure and low pressure piping in each room where installed outside the machinery room, shall be signs, as specified above, with the name of the refrigerant and the letters "HP" or "LP".

15.3 New Sign for Changed Refrigerant. When the kind of refrigerant is changed as provided in 15.7 (Substitution of Refrigerant), there shall be a new sign, of the same type as specified in 15.2, indicating clearly that a substitution has been made, and stating the same information for the new refrigerant as was stated in the original.

TABLE 6—MINIMUM REFRIGERANT LEAK FIELD TEST PRESSURES

Refrigerant name	Chemical formula	Minimum field refrigerant leak test pressures, psig: High pressure side	Minimum field refrigerant leak test pressures, psig: Low pressure side
Ammonia	NH_3	300	150
Butane	C_4H_{10}	95	50
Carbon Dioxide	CO_2	1500	1000
Dichlorodifluoromethane (Freon-12)	CCl_2F_2	235	140
Dichloromethane (Carrene No. 1) (Methylene chloride)	CH_2Cl_2	30	30
Methyl chloride	CH_3Cl	210	120
Monochlordifluoromethane (Freon-22)	$CHClF_2$	300	150
Trichloromonofluoromethane (Freon-11)	CCl_3F	30	30

(b) When a compressor is used as a booster to obtain a low pressure and discharges into the suction line of another system, the booster compressor is considered a part of the low side, and values listed under the low side column in Table 6 shall be used for both high and low side of the booster compressor provided that a low pressure stage compressor of the positive displacement type shall have a pressure relief valve.

(c) In field testing systems using nonpositive displacement compressors, the entire system shall be considered for field test purposes as the low side pressure.

15.4 Charging and Discharging Refrigerants. When refrigerant is added to a system, except a unit system requiring less than 6 pounds of refrigerant, it shall be charged into the low pressure side of the system. Any point on the downstream side of the main liquid line stop valve shall be considered as part of the low pressure side when operating with said stop valve in the closed position. No service container shall be left connected to a system except while charging or withdrawing refrigerant.

15.5 Refrigerants Withdrawn from Refrigerating Systems shall be transferred to approved containers only. No refrigerant shall be discharged to a sewer. (See Interstate Commerce Commission Specifications).

15.6 Containers Used for Refriger-

ant Withdrawn from a Refrigerating System shall be carefully weighed each time they are used for this purpose, and the containers shall not be filled in excess of the permissible filling weight for such containers and such refrigerants as are prescribed in the pertinent regulations of the Interstate Commerce Commission.

15.7 Substitution of Kind of Refrigerant in a system shall not be made without the permission of the approving authority, the user, and the makers of the original equipment, and due observance of safety requirements, including:

(a) The effects of the substituted refrigerant on materials in the system;

(b) The possibility of overloading the liquid receiver which should not be more than 80 percent full of liquid;

(c) The liability of exceeding motor horsepower, design working pressure, or any other element that would violate any of the provisions of this code;

(d) The proper size of refrigerant controls;

(e) The effect on the operation and setting of safety devices;

(f) The possible hazards created by mixture of the original and the substituted refrigerant;

(G) Effect of the classification of the refrigerant as provided in this standard.

15.8 Refrigerant Stored in a Machinery Room shall be not more than 20 percent of the normal refrigerant charged nor more than 300 pounds of the refrigerant, in addition to the charge in the system and the refrigerant stored in a permanently attached receiver, and then only in approved storage containers. (See Appendix 2.)

15.9 Masks or Helmets. One mask or helmet shall be provided at a location convenient to the machinery room when an amount of a Group 2 refrigerant between 100 and 1000 pounds, inclusive, is employed. If more than 1000 pounds of a Group 2 refrigerant are employed, at least two masks or helmets shall be provided.

15.9.1 Only complete helmets or masks marked as approved by the Bureau of Mines of the United States Department of the Interior and suitable for the refrigerant employed shall be used and they shall be kept in a suitable cabinet immediately outside the machinery room or other approved accessible location.

15.9.2 Canisters or cartridges of helmets or masks shall be renewed immediately after having been used or the seal broken and, if unused, must be renewed at least once every two years. The date of filling shall be marked thereon.

15.10 Maintenance. All refrigerating systems shall be maintained by the user in a clean condition, free from accumulations of oily dirt, waste, and other debris, and shall be kept readily accessible at all times.

15.11 Responsibility as to Operation of the System. It shall be the duty of the person in charge of the premises on which a refrigerating system, containing more than 50 pounds of refrigerant is installed, to place a card conspicuously as near as practicable to the refrigerant compressor giving directions for the operation of the system, including precautions to be observed in case of a breakdown or leak as follows:

(a) Instruction for shutting down the system in case of emergency;

(b) The name, address, and day and night telephone numbers for obtaining service;

(c) The name, address, and telephone number of the municipal inspection department having jurisdiction, and instructions to notify said department immediately in case of emergency.

15.12 Pressure Gages should be checked for accuracy prior to an air test and immediately after every occasion of unusually high pressure, either by comparison with master gages or by setting the pointer as determined by a deadweight pressure gage tester.

N A P R E

Question Box

H. G. Venemann, Professor of Refrigeration, Purdue University and chairman of NAPRE Educational Committee, answers members operating problems monthly in this column. Send questions to Chairman H. G. Venemann c/o Purdue University, West Lafayette, Indiana.

Refrigerating for Steam Condensing

Question No. 856: I have considered the idea of cooling the exhaust steam in steamship condensers by mechanical refrigeration instead of the present water circulation method. I have discussed this method with several engineers, and it is agreed by all that this method would be ideal, but all

but myself think the tons of refrigeration required would be excessive. The problem is: how many tons of refrigeration would be required to condense the steam from 10,000 hp turbine with a water rate of 8 lb. steam for hp hour, 28 inches of vacuum in the condenser? The temperature of the steam as it leaves the low pressure turbine is 101 degrees Fahrenheit and a temperature of 80 degrees is desired for the condensate.

If you will give me this information in a simple form, I would appreciate it very much. I would also like to have your opinion on the feasibility of this idea.—J.S.W.

ANSWER: When you read the answers which I have calculated to solve the problem as presented, I believe that you will conclude that you had better continue to condense the steam with water, rather than with a refrigeration plant.

If we assume that steam is to condense at a temperature of 80 F corresponding to a pressure of 1.032 inches absolute (28.96 inches vacuum) and that it enters the condenser with a quality of 90 percent, we will have to remove 932 Btu from each pound. This would require a refrigeration plant of 6,213 tons capacity, computed as follows:

$$\text{Tons capacity} = \frac{8 \times 10{,}000 \times 932}{12{,}000} = 6{,}213$$

If we assume that the refrigerant is condensed at 101 degrees with water and evaporated at 50 degrees, it will require a motor of about 5800 hp to drive the compressor. And it will require about 18,000 gallons of water per minute to condense the refrigerant, if we assume a 10 degree rise between the inlet and outlet temperatures. This is more water than is required to condense the steam assuming the same 10 degrees rise.

What have we gained by using the refrigeration plant? Well, we have gained about 1 inch lower pressure and about 10 Btu of available energy per pound of steam. This would be equivalent to an additional 94 hp out of the turbine based on a turbine efficiency of 30 percent.

What has this gain cost? (1) A refrigeration plant of 6,213 tons capacity, (2) a compressor motor of 5,800 hp, (3) a larger water pump, (4) a larger pump motor, (5) the expense of a complete refrigeration system, and investment of around $2,000,000.00, (6) another boat to house the refrigerating plant, (7) another boiler plant, turbine, condenser, and

auxilliaries to make up for the 5800 hp used by the compressor motor, and (8) finally the problem of deciding whether to use a refrigerating system on the new condenser.

In conclusion let me say that it never pays to use high grade energy such as shaft power, when low grade energy such as that obtained from cooling water may be had for the mere pumping.—H. G. VENEMANN.

Waterproof for Ice Tank Covers

Question No. 857: For a number of years the only method of waterproofing ice tank covers found to be even fairly satisfactory has been to have them thoroughly dry and then to soak them for several hours in boiling linseed oil. A mixture of ⅔ transformer oil and ⅓ paraffin oil has been recommended as superior to linseed oil for waterproofing covers. Is there any known experience with this product, if not, what other materials are known to be satisfactory for this purpose?—H.N.R.

ANSWER: I have not been able to contact anyone who has had experience with a mixture of ⅔ transformer oil and ⅓ paraffin oil for water-proofing covers. I understand that the paraffin oil should be an excellent ingredient. Prof. E. W. Stark of our horticulture department tells me that woods are being impregnated with synthetic resins which when heated polymerize and become as hard as plastic. He suggests that we contact the Koppers Co. of Orrville, Ohio who are doing considerable research right now on wood preservatives.

Emerson Brandt suggested that I write to D. P. Norris of the Shippers Ice Co., Phoenix, Ariz. for an answer to this question. Although Mr. Norris has had no experience with the mixture, he has some excellent ideas on the care of ice tank covers which I pass on to you.—H.G.V.

In all plants that I have contacted the cover problem has been the usual "eye sore." It has not been my experience to have seen or tried the transformer and paraffin oil treatment, however upon painting the lids I do not feel that the paint would adhere to the above base.

The most satisfactory solution I have found is as follows:

Apply two coats of hot linseed oil allowing approximately 30 days for drying, then paint using Tnemec Brine Lid Enamel No. 27. I have also found that the care taken of the cover lids during operational functions have aided considerably. Have the puller not to pull lids over one another, but pull from succeeding row with that one to cover completed row and then have puller mop all ice tank cover lids, that were used during shift pull, at completion of his specific shift.

I would not say this is a completely satisfactory solution to the problem but has proven more successful than any up to date.—D. P. NORRIS.

Discharge Gas Coolers

Question No. 858: Where head pressures are high, due to shortage of condenser or cooling tower, ammonia gas pre-coolers are sometimes used between the compressors and condensers. In many cases, heat radiating fins of metal might be installed on the discharge lines in the plant, which might be effective, especially if the discharge lines were fairly long. Such fins might give some reduction in temperatures of the ammonia gas. Do you think this would be practical? Has this ever been tried? Do you know where these fins can be purchased for use over pipe of standard size?—S.M.U.

ANSWER: As you have mentioned in the letter with your question, the Rex Superheat Extractor provides mechanical means for cooling the discharge gas. At the main plant of the Golden State Co. Ltd., in San Francisco, Bert McKenna has installed a bank of fin pipe on the roof through which the gas circulates on the way to the condenser and he reports good results from it.

Theoretically it is possible to put fins on as much of the discharge piping as one desires but the application to old pipe might be difficult in the field and the bonding of the fins would be a problem unless the pipe were carefully cleaned and the pipe were galvanized on the outside to bond the fins and prevent rust at the point of contact. Where the discharge pipe runs inside the building, the extra heating in the summer time might be objectionable.

Fin piping could be used for any portion of the discharge line which runs outside or a bank of fin pipe could be set up. Especially if the fins are on a single run I believe they should be shaded from the sun to prevent heating from that source.

The Detroit Ice Machine Co., makes cast aluminum fin pipe which would be useful in this service. This is 1½ in. pipe and would have to be used in parallel for larger discharge mains. Standard circular fin pipe is made by numerous manufacturers. They put fins on large pipe as well as the smaller sizes, but I believe that for this type of service the pipe should not be larger than 1 to 1½ in. Where the pipe is large the hot gas inside would not have enough turbulence and wall contact and the value per square foot of fin surface would be diminished.—EMERSON BRANDT.

New Questions

Answers in October Issue

Cold Pipe Insulation

Question No. 859: We have some suction lines insulated with two layers of 1 in. hair felt which is supposed to be good for temperature down to 5 F. The lines carry ammonia gas at 20 psi and the condition of the insulation is not good although it was originally installed by experts. Can you give any indication of what might be causing the trouble?—S.L.C.

Opening Ammonia System

Question No. 860: I have read the published report of another case where workmen were injured by escape of ammonia when they removed the head of a compressor. Would it not be a good idea for workmen to adopt a standard procedure of putting on an ammonia mask whenever they open an ammonia system?—T.L.A.

Rubber Gaskets

Question No. 861: We have a multipass horizontal shell and tube condenser in which rubber gaskets are used as seals between the heads and tube sheets to seal the different water passes. Wherever this rubber gasket material touches the end of a tube it appears to be corroded away. Is it possible that there are types of rubber which form a corrosive combination with the condenser water? How could these be avoided when securing gasket material?—R.V.C.

Many Questions Answered

MANY questions that come up in the normal course of plant operation will be answered at the Los Angeles convention. Speakers there know what the engineer wants in the way of information and their lectures and demonstrations are planned with this in mind.

For example, many questions about electrical equipment will be answered by Regis Gubser in his noteworthy demonstration "Do's and Don'ts of Electrical Maintenance."

Plan now to be in Los Angeles on November 28 to December 1. You will have a profitable and enjoyable time at the convention.

News Notes and Activities of Chapters

N.A.P.R.E. Department

New Orleans

By Leo Vivien

THE meeting of July 12 was a field trip to visit the plant of Prager Incorporated. When the group had assembled the people were welcomed by Paul LeBlanc, gear expert of the company. Then he went on to discuss some of the things to be seen by the visitors. "The equipment to be demonstrated is thoroughly modern and complete, and includes the very latest type gear cutting machinery where we can handle from the smallest, to a gear 7 feet in diameter, handling spurs, bevel and mitre gears, worm and worm wheels, spirals, helicals, herringbone gears and sprockets and chains of all descriptions. The company represents and handles Whitney Chains and Products, Mr. LeBlanc said.

"While it is true, that the designer or one seeking gears is guided by a long established standard of Diametral Pitch, there are certain conditions, such as ratios and center distances where those established Diametral Pitches are of very little help. That is where gear engineers can be of valuable assistance to you, in the job of designing, laying out, proportioning, and dimensioning of the gear tooth, proper selection of material to create good running and satisfactory gears.

"Equipment for handling gears has constantly improved, and we have added to such an extent that we are now equipped to offer our services for practically any job whether it be construction, repairs, general machine work, breakdown jobs or special machinery, we are open for your call at any time, day or night."

Before the various groups were taken through the shop they were shown a motion picture which gave views of the actual operations on different machines.

The affair was quite well attended. Refreshments were an added attraction which all the members present enjoyed.

At the following meeting Frank Graham of York Corporation was the principal speaker. He lectured to us on the subject of modern centrifugal water cooling systems and "W" type compressors. The lecture was illustrated with slides which added a great deal to the interest in the subject and Mr. Graham concluded by showing a motion picture which traced York compressors from the very early models to the latest compact high speed machines.

The chapter held its business meeting on August 9. The time was devoted to discussion of a program to secure a large number of new members and promote a larger percentage of attendance at the meetings. Many good suggestions were presented and the program is being worked out.

The second part of the meeting was entertaining and instructive. A motion picture was shown on public relations and how they are developed. The concluding movie about Flying Fishermen drew a great deal of attention.

Doneis in South Dakota

Armin Doneis, Secretary of the Rio Grande Valley Chapter has been spending the summer in the north but not on vacation. As a part of the Missouri River development program the Fort Randall Dam is being built near Pickstown, S. D. This huge structure is of earth filled construction with a crest length of almost 2 miles. Involved in the spillway, water tunnels and other works there is more than 1 million yards of concrete.

Refrigeration is required to prevent undue heating in these large masses of concrete and Mr. Doneis is looking after the operation of ice making machines which produce ice to be mixed with the concrete materials. He writes that he was pleased to find that a model town provides good accommodations for the workers. It is not at all like the general conception of construction camps.

San Francisco

By F. H. McLaughlin

Chairman Wilbur Roberts not only arranges good educational programs but is also capable of taking over and presenting a good one himself. On July 12 he was the speaker on the subject "Instrumentation and Why."

Mr. Roberts pointed out that a great percentage of refrigeration plants do not have a good thermometer, and that subsequent situation is the fault of the industry as a whole, not just the fault of plant operators, and not just the fault of plant owners. The types of temperature indicating and recording devices available were discussed, as were the advantages of using each type. A great bit of detail was presented regarding recommended points in a system where instruments are valuable.

In summation, Mr. Roberts gave us several practical and interesting examples of the accomplishments of the instruments and pointed out that instrumentation makes for better plants and plant operators, makes it easier to do the job, makes the operator more interested in good plant practice and saves money for the management. The presentation was one of the finest that our chapter has been favored with and held a good deal of practical experience that we can all benefit by.

At the July 26 meeting we had an exceptional experience inasmuch as we made a trip to the San Francisco office and factory of the Gotham Instrument Co. The program was sponsored by Alan H. Scurfield and Ted S. Jerstad of the Anchor Equipment Co., San Francisco who are distributors for the Gotham Instrument Co.

Charles Halpern welcomed those in attendance on behalf of Gotham Instrument Co., as well as the Anchlor Equipment Co., and then turned us over to Max Wahl, who is in charge of the thermometer manufacturing and repair department of the company branch.

Mr. Wahl proceeded to take us through the actual manufacturing process of a mercury tube industrial type thermometer starting with the plain tubing, the evacuating and filling of the tube, the calibration of the tube and the setting in the final case. The skill shown by Mr. Wahl was amazing to all of us and with no difficulty at all our members present realized that the manufacture of thermometers is a pursuit that takes years of experience. The program was most interesting from start to finish and was of incalculable value to our chapter.

In accordance with the vote of the membership the chapter is recessed during the months of August and September. Meetings will be resumed on Wednesday, October 11.

Memphis

By Charles Conley

The story of how TVA current was brought to Memphis and distributed throughout the city was presented to the members at the July 5 meeting by C. L. Osenbaugh, Chief Engineer of Electrical Distribution and Joe F. Fossick, Electrical Underground Distribution Engineer of the Memphis Light, Gas and Water Division. They told how the electrical system was tied in with the other large electric sources in connection with the two 120,000 volt TVA lines which come to the city. A large steam generating plant is held in readiness to operate at all times.

They used slide pictures and large graphic charts to explain their talks. The loop section of the city is supplied by an underground network. They are at this time installing an underground main feeder of 110,000 volts, all in steel conduit with oil pressure of 200 pounds carried on this conduit at all times to seal out all water and such from the high voltage cables.

The chapter welcomed to membership Albert A. Addison, Sr., a veteran refrigeration engineer and at this time instructor of refrigeration at the National Vocational and Technical College and Walter H. Hill engineer at the new TB Hospital.

Fresno

By M. Pedersen

At the meeting on July 24 we had a discussion of plant operating problems. One question which found no ready answer was concerned with a compressor having bronze insert piston rings. The oil in this compressor turns dark as though it has some contamination but when it is cleared up by filtration remains clear for some time. The question was sent to the National Question Box.

In order to celebrate the twenty fifth anniversary of the chapter the Entertainment Committee has planned a Pot Luck Dinner at the home of Mr. and Mrs. C. P. Shupe. The date they have announced for this party is September 28.

Membership Prizes are Now Ready

PERMANENT trophies have been set up this year for each of the two divisions of the Membership Contest. They will be inscribed and awarded to the winning chapter until they are retired by any chapter winning a trophy 3 times. The prize in the first division will be awarded on the basis of the total number of members added by the chapter during the year and a bonus of points will be added, equal to the percentage of renewals obtained in the same period.

Chapters vary in size. To make the contest equitable for smaller chapters the trophy in the second division will be awarded on the basis of percentage increase after applying a bonus for renewals as in the first division. The way is thus open for all chapters, large and small to win one of the very desirable trophies.

This year there is greatly increased incentive for everyone to work hard on membership building. In addition to the chapter awards are the Pyramid Prizes contributed by a number of the chapters. These prizes are valuable and novel since they are composed of products representative of the territories in which the chapters are located.

They are composed of food, wearing apparel and household items which will make the winners very popular around home. In fact if member's wives studied the list they would shortly be out helping their husbands in the membership race.

Here, too, the size of the chapter is considered in order to be fair to all contestants. In awarding the Pyramid prizes there will be a division of the chapters into two groups: those above 75 members and those having less than 75 members. Each member winning in his division will have a separate group of prizes.

Evidently the present membership contest has good value for all, members and chapters alike. People who accomplish good results usually do it in a hurry. Six weeks remain before the closing to do good work for yourself and your chapter.

Both of the contests close October 15. This includes the two divisions of the chapter race and the individual contests for prizes in the pyramid group.

Winners in the Membership Contest will receive this beautiful trophy. It consists of a walnut panel 12 inches wide by 14 high. A metal plate it attached to the lower part of the panel on which the name of the winning chapter will be engraved each year. Three wins will entitle a chapter to permanent possession. Above the name plate a golden figure upholds the torch of knowledge, flanked on either side by slender round columns, each adorned with an eagle with spread wings. The words "Morality-Economy-Competency" are engraved on a circular plate near the top of the panel board.

Foreign Engineers Tour United States

A GROUP of prominent refrigeration engineers, food technologists and cold storage experts from eleven Marshall Plan countries are touring the United States to inspect latest developments in the handling, and storing of perishable commodities.

Forty-eight participants in this ECA technical mission arrived in New York and spent more than a month on an inspection tour which has taken them to the Pacific Coast and back. They visited Philadelphia, Washington, Kansas City, St. Louis, Dallas, Los Angeles, San Francisco, Portland, Ore. and Chicago.

Included in their itinerary were trips to inspect leading cold-storage warehouses; ice manufacturing plants; frozen food processing and storage plants; railroad yards where refrigerator cars are iced, and similar installations.

Front row: T. Van Hiele, Holland; Jules Foulon, Belgium; S. A. Andersen, Denmark; Rudolph Plank, Germany; Victor Warchalowski, Austria; Dr. Ernest Baumgartner, Switzerland; F. Chauve, France.

Second row: Raymond S. Stimson, Washington, D. C.; Hendrik Brouwer, Holland; Jorgen Lorentzen, Norway; M. Bosquet, France; Luciano dell 'Orto, Italy; Emile Laurent, Belgium; Josef E. N. Kjelleras, Sweden; Michel Anquez, France; Jean Laridan, France;

Third row: M. W. Garland, Frick Co.; C. C. Smith, Frick Co.; W. H. Aubrey, Frick Co.; John W. Bannard, England; Andree Neuenshwander, France; Frederick Beams, England; Lar-Georg Hagert, Sweden; Ivar Brandin, Sweden; K. G. E. Larson, Sweden.

Fourth row: Peter Hess, Frick Co.; Joaquin Alvarez, Frick Co.; R. T. Snively, Frick Co.; H. K. Nielsen, Denmark; J. vanMale, Holland; Karl Koop, Germany; Otto Wagner, Germany; Terry Mitchell, Frick Co.;

Fifth row: Rolf Olaussen, Norway; James Olser, England; Frans Schets, Holland; Cornelis Hoen, Holland; Jacob Moerkerke, Holland.

Plan Your Vacation in Los Angeles November 28 to December 1

THE people who attend the 41st annual meeting in Los Angeles will be treated to numerous features which will add plus value to their visit to Los Angeles. The city and area are magnets for tremendous numbers of people who arrive daily by all forms of transportation. It is a famed vacation spot. That is why Los Angeles Chapter has been urging everyone to plan his vacation this year to be in their city around the dates of November 28-December 1.

Many people enjoy a Los Angeles vacation on their own. There is much more to be enjoyed on a trip sponsored by a local group and arranged in accordance with their intimate knowledge of the region and what it has to offer the visitor or vacationer. The chapter has promised a full quota of enjoyable group events for those attending the convention.

Special Attraction

In addition they have set up to assist the individuals and smaller groups to plan special trips and entertainment they may wish to enjoy. Everyone who comes to Los Angeles and Hollywood usually has heard enough about these places to have some ideas of his own on entertainment. Yet it is not easy for the casual visitor to arrange what he wants. With chapter committees on the job to assist the problem is considerably altered. In fact there is no problem at all; it is transformed into an enjoyable occasion.

In case a few people forgot it may be well to mention again that headquarters for the convention is in the Hollywood-Roosevelt Hotel. That is a splendid location for the meeting. It is a well appointed, friendly place with excellent services at moderate cost.

A block reservation has been made at the headquarters hotel. Later, individual reservation cards will be distributed to all members, along with details of the educational program and other features.

Multi-Feature Convention

Count them up. There are a lot of good reasons why you should have your plans fixed to be in Los Angeles the last week in November. But that is not all. The educational program at Los Angeles will be on a par with all the other convention features. The full schedule was completed some time ago. It covers those phases of refrigeration in which our members are most interested and will be presented in the manner calculated to give permanent value to the audience.

Several of the subjects will be given in dramatized skits. This form of presentation has come into much wider use recently because it gives information in easy-to-remember form. Also it will enliven the convention. Possibly more engineers will be encouraged to take part in the discussion that follows and ample time is scheduled for this purpose.

For many of us who live in the more northern sections of the country, it will be an opportunity to prolong a pleasant autumn beyond the usual time. From the east, railroad fares permit a wide circle trip without extra cost so it is possible to enjoy much of the coast on the round trip fare to point of destination.

There is more to the story but this is enough to show that those who plan for the trip to the 1950 Convention will find what they want in both engineering and entertainment.

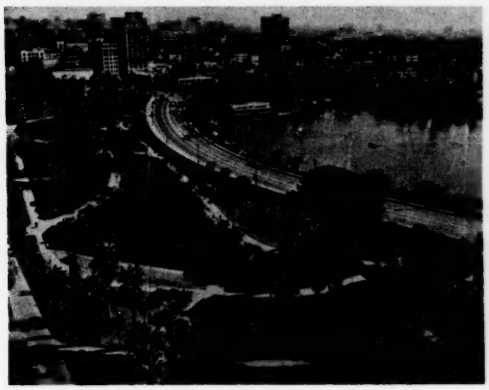
Operating Data Book Distributed to Members

PUBLISHED in August, the 1950 Operating Data Book has been distributed to the NAPRE membership. It is the tenth edition of the association's annual reference book for engineers. Featured in the current edition are engineering papers from the 40th National Convention, reference data and an extensive Question Box section.

Much basic information is presented on refrigerating plants and allied subjects. For instance one large illustration with numerous reference notes provides a check or guide for an adequate system. Many engineers will want to check their plants with the one shown.

The further extension of the association's Question Box adds valuable material in the form the members like to use. It provides much more information on the day to day problems that arise in the plant, as well as more general propositions that come in for speculation and analysis in meetings.

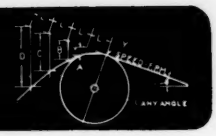
The 1950 books have been sent to the chapters for distribution to their members. Be sure to attend the next meeting and get your copy.



The place where Wilshire Boulevard crosses MacArthur Park is a magnet for tourists and townspeople alike. Those who have been there want to return.

The Pacific Palisades near Santa Monica with the blue Pacific rolling into the shore. This famed spot is conveniently close to the convention headquarters.

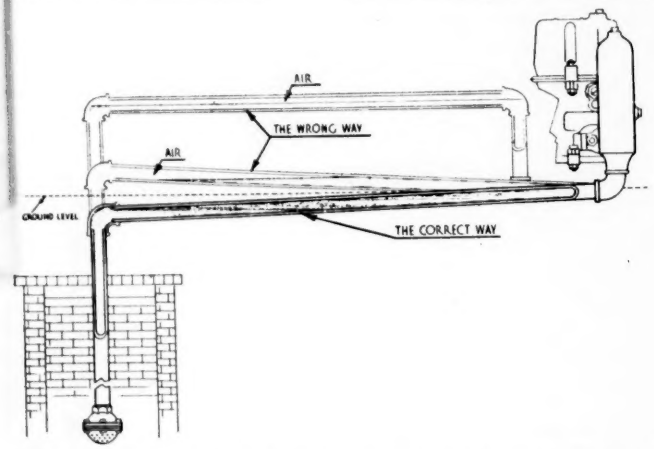
ENGINE ROOM POINTERS –



How Install Suction Pump

IS YOUR pump giving trouble? Maybe it is "air bound" as indicated in this sketch. Usually a small amount of air is present in all water, hence if any point in the suction piping (from well to pump) is higher than the level of the pump, the air will automatically separate from the water and will form a pocket in the high point of the line. The air will gradually collect there until it reaches such a volume that it merely compresses and expands with the pump strokes. There will then, of course, be no flow of water whatever. The pump will be "air bound".

This sketch shows the proper method of piping. The suction line should be arranged with a gradual slope from the pump to the water supply. The slope should be at least one inch to each fifteen feet. Just above the correct way two wrong ways are indicated by means of lighter lines. If for any reason you are forced to use such a method of piping as marked "wrong" be sure to use a tee and a plug instead of the first elbow. You can then release the accumulated air when necessary.



Careful attention to this diagram will save time and trouble. The suction line must be air tight. Care must be taken to lead or paint all joints to guard against leaks. If the suction line leaks, the pump will give trouble. An "almost horizontal" suction line is practical up to 1000 feet, but care must be taken to gradually slope it from the pump to the well. The longer the suction line, the greater the strain on the suction valves in the pump. On suction lines over 100 ft. in length it is essential to use an extra vacuum chamber to relieve the suction valves and also to guard against water hammer.—W. F. S.

Ball Bearings Pointers

THIS writer has had experience with ball bearings in various ways for nearly fifty years and he now confesses that even he himself is becoming amazed at the remarkable performance of modern types. When first introduced—on bicycles—ball bearings were considered a "delicacy," and they were rather delicate. But today they run on and on, under most severe conditions.

For example a test was conducted—over five years of continuous operation—at 3600 rpm., with a load on the bearing of 25 pounds. The total revolutions during that time amounted to a staggering 11,000,000,000 (eleven billion, in other words). Did that wear it out? Not by any means. The testing engineers stated that it was still good for many more thousands of hours of continuous running—many more billions of revolutions.

Ball bearings should not be allowed to become too hot, but don't be alarmed if they become warm. Sometimes the grease itself is the cause of the warmth. Thus when a ball bearing starts up the grease is cold and it takes time to warm up the bearing sufficiently to thin the grease enough to be expelled from the contact and rotating parts. Then after that happens the temperature sometimes actually reduces. Therefore to add lubricant to a warm bearing can often be a mistake as there is such a thing as "too much" lubricant. Adding lubricant can make the bearing warmer. The right kind of lubricant is also important. If there is anything that deserves the best lubricant obtainable it is ball bearings. —S. F. W.

Use Standard Repair Parts

INSTEAD of trying to make your own repair parts, it is usually more economical and better in every way to buy them from the manufacturer of the machine needing repairing. In special emergencies it may be excusable to hire a neighboring mechanic to make a repair part but, the chances are that the part won't fit as well as would a part purchased from the maker of the machine. As a result the machine will give less efficient service, its usefulness will be impaired, and the reputation of the manufacturer may be injured for no fault of his own.

Consider, for example, a part as simple as a brass bushing appears to be. Many mechanics think they can make bushings as capably as can the manufacturer himself, but the truth is that they cannot. The manufacture of a finished bronze bushing is a specialized job. Many years of experience, and much skill are required to make bushings right. The same is true of bearings and many other parts made of special alloys. It is safe to say that 99 times in 100, in this day of special metals, the home-made product is made of the wrong material.

Also, when buying machinery, it is usually best to buy standard machinery rather than something "special". If the machine is standard the manufacturer can supply you with repair parts at less expense and more quickly than if the machine is special. For standard machines the manufacturer generally has an ample supply of repair parts in stock. For special machines, if repair parts are needed, the manufacturer must refer back to his blueprints and make those parts, as they are seldom kept in stock.—S. W. F.

Refrigerated Warehousing Industry

NATIONAL ASSOCIATION of REFRIGERATED WAREHOUSES

Division of American Warehousemen's Association

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THIS MONTH IN BRIEF

To know which varieties of apples are better for freezing is important knowledge that every processor should have. To obtain this information a study has been made by the Michigan Agricultural Experiment Station and the results of the study published.

The Great Lakes Chapter of the National Association of Refrigerated Warehouses will have a combined late summer meeting and outing at Maxwelton Braes resort in Wisconsin September 8 and 9.

The 60 percent cooler occupancy of refrigerated warehouses on July 31 was unchanged from a month earlier. Freezer occupancy was three points greater than the previous month but four points below normal.

A United Nations publication summarizes information on the refrigeration and freezing of foods. It is an effort to summarize the scientific information made available by lectures and discussions at a meeting held in Europe in October, 1948.

Selecting Apple Varieties For Pre-Freezing

Some Varieties of Apple Respond to Freezing Better Than Others. Processors Should Know Which are Best Suited.

KATHARINE G. KNIGHT and PAULINE C. PAUL

Department of Food and Nutrition
Michigan State College
East Lansing, Michigan

SINCE all varieties of apples do not respond to freezing in the same way, it is important for a processor to know which kinds are best suited for preservation by this method. Also, he should know the best pre-freezing treatments to insure fresh color and crispness.

To supply this information, a study was made of five of the most important apple varieties grown in the state of Michigan.† Of these varieties, excellent freezing qualities are possessed by Rhode Island Greening and Jonathan apples. Furthermore, they were even more acceptable when treated with ascorbic acid prior to freezing.

Varieties tested were McIntosh, Rhode Island Greening, Jonathan and Northern Spy.* The apples were run-of-the-orchard. And they remained in storage for approximately one month before they were prepared for freezing.

Methods of Study

Apples were peeled and cored on a mechanical unit, dropped into a 1 percent salt solution to prevent browning between peeling and subsequent handling, then trimmed and sliced into twelfths.

Control samples were frozen without further treatment. Other samples were treated with: (1) An 0.08 percent solution of l-ascorbic acid under vacuum; (2) a combination of 0.08 percent ascorbic acid and 0.1 percent calcium chloride under vacuum; (3) a 0.1 percent solution of sodium metabisulphite (as source of SO_2); and (4) the sodium metabisulphite solution after soaking in 0.5 percent $CaCl_2$ for 30 min.

The sodium metabisulphite treatment consisted of immersing the fruit in the solution for 2 min., then draining followed by storage in a covered container for 3-hr. to permit penetration of the SO_2.

After the apples were treated, enough slices for one 9-in. pie were packed into waxed 1-qt. paperboard tubs with slip-in lids. Four parts of fruit were packed with one part sugar, taking care to get a complete mixture. The fruit was frozen at —40 deg. F. and held at 0 ± 2 deg. until used.

Tests on Apples

The tests were made on the apples before they were prepared for freezing and after they had been in zero storage 2, 4, and 6 months. Samples were baked into pies and scored subjectively for color, consistency, odor, flavor, tenderness and texture of fruit, texture of crust, general conclusions, and acceptability. Color was measured by a spinning disk colorimeter using the Munsell system. Raw

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Based on paper "Freezing Qualities of Five Varieties of Michigan Apples," authorized for publication as Journal Article 1056 (N.S.) of the Michigan Agricultural Experiment Station. Funds provided by Rackham Research Foundation.

† Apples were harvested in the fall of 1947.

* Baldwin variety apples were also studied, but due to an early frost they were immature when picked. For this reason the results are not included in this report. The other varieties were firm and well-colored.

fruit was used for analyses for ascorbic acid and SO_2.

Results of Test

Rhode Island Greenings received the highest average general conclusion score for all treatments of the entire test period. Jonathans were second, McIntosh third, and Northern Spy fourth. The Jonathan apples were acceptable a greater number of times than any other varieties. They received the highest score during the entire test period for plain frozen apples. Northern Spy and McIntosh were poorest.

Rhode Island Greenings had the highest score for fruit treated with ascorbic acid, Jonathans were a close second, and McIntosh received the lowest score. Ascorbic acid with Ca Cl_2 produced about the same results with Jonathans, Rhode Island Greenings and Northern Spies, and again the McIntosh variety was lowest.

McIntosh apples gave better results with SO_2 than with any other treatment. For this treatment, Jonathans and McIntosh apples had the highest scores. Rhode Island Greenings received the highest score for fruit treated with the combination SO_2 and $CaCl_2$ treatment. Here, McIntosh was second, Northern Spy third, and Jonathan fourth. The Jonathan variety kept best in zero storage and the McIntosh the poorest.

Fruit treated with ascorbic acid received the highest scores for flavor and general conclusion. Order of desirability for the other treatments was sodium metabisulphite, ascorbic acid and $CaCl_2$ sodium metabisulphite and $CaCl_2$, and the control. Addition of $CaCl_2$ lowered the scores of all samples.

The Jonathan was the only variety that remained acceptable without any treatment. Samples that were treated to prevent browning were acceptable most of the time. Addition of $CaCl_2$ to the SO_2 treatment reduced acceptability of these samples more than the addition of it to the ascorbic acid.

Color measurements indicated that the hue, value, and chroma changed very little between the test periods. The Jonathan variety had the lightest and brightest color, the McIntosh was second.

The control sample of McIntosh variety had the lowest average notation for hue, indicating that it had the greatest amount of red. Rhode Island Greening samples treated with ascorbic acid were the most yellow, and Jonathans changed in color less in storage than any other variety. Samples frozen without any treatment were darker than those that were treated.

Effect of Ascorbic Acid

Ascorbic acid appeared to be stable in the samples treated with it alone. Samples treated with ascorbic acid and $CaCl_2$ lost ascorbic acid in storage. However, these samples took up more ascorbic acid in the beginning than those treated with this vitamin alone.

SO_2 was well retained in the samples during zero storage. Northern Spy apples did not take up as much SO_2 as did the other varieties and gave a darker product because of this.

From observations made in this study it appears that: (1) Rhode Island Greenings rated first and Jonathans rated second of the varieties tested; (2) apples must be mature at time of harvest to make a satisfactory frozen product; (3) ascorbic acid was best for prevention of browning in Rhode Island Greening, Jonathan and Northern Spy apples. Sodium metabisulphite (SO_2) was best for the McIntosh variety, and (4) calcium chloride, in the proportions used, did not improve the quality of the apples.

Warehousemen Plan Industry Action

TO FORMULATE plans for industry action in the current national crisis, eight members of the Emergency Plans Committee of the National Association of Refrigerated Warehouses met in Washington July 24. Speaking through Committee Chairman V. O. Appel of Chicago, the Committee urged NARW members to put themselves in standby condition for wartime operation. The Committee also advocated full cooperation with the government in meeting defense-planning needs.

Association members were polled on support of a specific plan for industry action in the matter of priorities and space allocations. Voluntary cooperation with both military and civilian authorities was stressed as highly desirable. Membership response to this action was immediate. An overwhelming number favored unqualified endorsement of the Emergency Plans Committee recommendations.

NARW is one of the first trade associations to plan objectively for industry preparedness in the event of a general war because of the strategic position occupied by cold storage houses throughout the nation.

Great Lakes Chapter Summer Meeting

A LATE summer meeting of the Great Lakes Chapter, National Association Refrigerated Warehouses, will be held Friday and Saturday, September 8 and 9 at Maxwelton Braes, 15 miles northwest of Sturgeon Bay, Wisconsin. Two morning sessions will be held starting at 9:00 a.m. both days, both afternoons being left open for golf and other entertainment.

About thirty-five members of the chapter, their families, and other warehousemen, are expected to attend. Invitations have been extended to H. C. Diehl, director of the Refrigeration Research Foundation and Wm. Dalton, executive vice-president of the National Association of Refrigerated Warehouses, and J. L. Gagini, president of the National Association of Refrigerated Warehouses. All warehousemen are invited.

Round-table discussions will constitute most of the program, dealing with war emergency measures, the general storage situation, legislation, and other subjects of current interest of particular importance at this time to members of the Chapter and the refrigerated warehousing industry in general.

For those who do not wish to drive, good train service is available from Chicago and Milwaukee, arriving in time for dinner, or later as preferred. Buses meet the trains at Manitowoc for Maxwelton Braes. Those who plan to attend are asked to contact James Kuehn, secretary of the Great Lakes Chapter, Wisconsin Cold Storage Co., 344 East Florida St., Milwaukee, Wis. L. M. Ashenbrenner of Toledo is chairman of the chapter.

Refrigerated Warehousing Industry Meetings

INDUSTRY meetings of the Refrigerated Warehousing Industry during September and October are announced as follows:

Executive Committee, National Association Refrigerated Warehouses at the Statler Hotel, Washington, D. C., October 16 and 17.

Great Lakes Chapter at Maxwelton Braes resort, Bailey's Harbor, Wis., September 8 and 9.

North Atlantic Chapter at Rochester, N. Y., September 12 and 13.

New York State Warehousemen's Association at Saranac Inn, Upper Saranac Lake, New York, September 15-18.

The Missouri Valley Chapter will hold a regular meeting in September at Wichita, Kansas.

August 1 Cold Storage Holdings

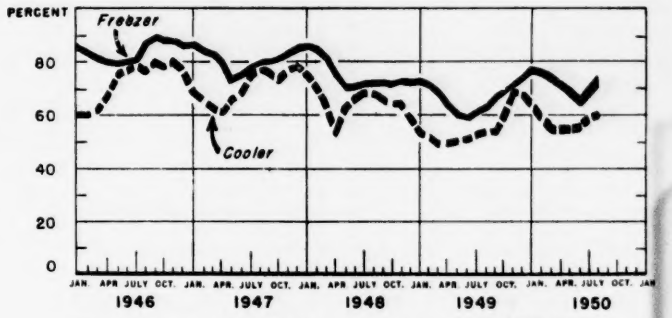
THERE was no change since last month in the percentage of cooler space in refrigerated warehouses as reported by the Production and Marketing Administration of the United Staes Department of Agriculture. The occupancy of 60 percent cooler space on August 1 was 7 points above that of a year ago and 8 points below average occupancy for this time of the year. Increased utilization of cooler space was reported in the New England, East North Central and West North Central regions. Wisconsin, the Dakotas and Nebraska led all other states in space occupied with 93 and 92 percent occupancy, respectively, reported.

A rise of 3 points since last month brought public freezer occupancy to 72 percent on August 1, 4 points below normal. Last year at this time freezer space was only 63 percent occupied. The East and West North Central and South Atlantic regions each showed slight decreases of 1 percent since last month in the utilization of freezer space. Occupancy of 85 percent or more for both coolers and freezers was reported in the following cities: St. Louis, Kansas City, Baltimore and Nashville.

The Nation's refrigerated storages held approximately 3 billion pounds of foodstuffs on August 1, which were about 12 percent greater than stocks a year ago. Normally, cooler-held commodities increase during July, but this month's stocks were 1 percent below the holdings of a month earlier. Nevertheless, the total weight in cooler storage—1.2 billion pounds—exceeded last year's stocks by 7 percent. All cooler-held commodities, except canned fruits and vegetables, pears, cheese and dried eggs, were in lesser supply this month than a month earlier. The net reduction of 17 million pounds compares with a net increase of 58 million pounds reported a year ago.

Freezer storage items continued to increase during July. With 1.7 billion pounds on hand—16 percent greater than a year earlier—stocks in freezer storage reflected a 53 million pound net increase over last month. This net increase was below the seasonal increase of last year, yet, August 1 stocks in freezer storage were 6 percent greater than average. Significant increases in storage holdings of frozen fruits, vegetables, butter and fish accounted for the near record freezer-held stores reported on hand for this time of year.

Dried and evaporated fruits, canned fruit and vegetables, potatoes and onions in storage on August 1 were below average for this time of year. Nutmeats were in lesser supply than a year ago as were nuts in shell. Other fresh fruits were a little more than half the average in store for this time of year.



Occupancy of public cold storage warehouses 1946-1950

Frozen fruits in storage on August 1 totaled 415 million pounds, which was a record high for this time of year. Since last month, frozen fruit stocks increased 58 million pounds or 16 percent. Although frozen fruits in storage were at a new monthly high, and exceeded average stocks by

TABLE I—COLD STORAGE HOLDINGS IN PUBLIC, PRIVATE AND SEMI-PRIVATE WAREHOUSES, APPLE HOUSES AND MEAT PACKING PLANTS (000 LBS.)

	Aug. 1, 1950	July 1, 1950	Aug. 1, 1949	Five-year Average
Meat and meat products, lbs.	548,280	633,160	547,201	587,409
Lard and rendered pork fat, lbs.	116,861	136,258	96,255	117,434
Frozen poultry, lbs.	102,975	122,328	71,261	123,823
Creamery butter, lbs.	230,652	185,167	136,786	111,489
American cheese, lbs.	260,180	229,785	162,346	159,857
Other cheese, lbs.	20,131	19,974	20,276	23,877
Shell eggs, cases	3,165	3,667	1,936	5,438
Frozen eggs, lbs.	175,420	188,476	168,394	235,222
Apples, bu.	106	165	175	
Frozen fruits, lbs.	414,817	356,409	327,090	335,764
Frozen vegetables, lbs.	275,465	235,955	237,847	222,442
Frozen fish, lbs.	126,845	116,897	127,217	114,532

TABLE II—PERCENTAGE OF SPACE OCCUPIED BY PUBLIC COLD STORAGE WAREHOUSES (APPLE HOUSES EXCLUDED)

	Net Piling Space (000 cu. ft.)		Aug. 1, 1950 (%)		July 1, 1950 (%)		Aug. 1, 1949 (%)		5-Year Average (%)	
	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer
New England	2,948	6,908	46	64	45	64	42	78	63	74
Middle Atlantic	36,548	29,050	44	71	47	66	44	62	62	77
East North Central	28,253	26,222	80	71	75	68	61	61	74	73
West North Central	10,669	15,399	84	85	81	86	70	67	80	77
South Atlantic	8,559	5,933	65	74	66	75	52	72	70	79
East South Central	3,318	2,785	76	90	81	90	66	82	81	81
West South Central	7,897	7,336	61	59	62	59	66	51	76	73
Mountain	1,386	1,113	58	77	65	65	54	67	74	82
Pacific	16,101	19,988	41	67	45	63	43	61	54	75
United States	115,679	114,734	60	72	60	69	53	63	68	76

TABLE III—PERCENTAGE OF SPACE OCCUPIED BY PRIVATE AND SEMI-PRIVATE REFRIGERATED WAREHOUSES AND MEAT PACKING PLANTS (APPLE HOUSES EXCLUDED)

	Private and Semi-Private Warehouses						Meat Packing Establishments					
	Net Piling Space (000 Cu. Ft.)		Space Occupied—Per Cent Aug. 1, 1950		July 1, 1950		Net Piling Space (000 Cu. Ft.)		Space Occupied Aug. 1, 1950		July 1, 1950	
	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer
New England	85	106	52	74	50	74	.....	.....	..	..	..	..
Middle Atlantic	1,226	1,092	47	85	50	74	1,619	298	86	89	86	85
East North Central	3,143	1,821	76	58	62	40	5,444	1,776	89	72	84	68
West North Central	1,070	2,728	84	91	91	48	14,221	6,418	85	82	85	83
South Atlantic	525	2,568	11	66	..	63	959	230	86	100	86	100
East South Central	.....	.....	..	..	..	..	403	100	84	92	87	91
West South Central	234	73	42	55	42	55	2,525	500	100	100	100	100
Mountain	102	291	100	62	..	..	767	438	93	95	100	100
Pacific	3,642	3,068	49	59	46	45	2,723	488	94	89	98	94
United States	10,027	11,747	59	70	53	56	28,661	10,248	88	83	88	83

NOTE:—Blank spaces indicate that insufficient returns were received.

79 million pounds, the seasonal increase was below average and the increase of a year ago. Last year, a 71 million pound increase was reported, whereas, the average July increase for 5-year period ended 1949 was 69 million pounds.

Since July 1, frozen cherries in storage increased by 30 million pounds; raspberries, 23 million pounds; strawberries, 10 million pounds; other fruit items except apples, blueberries, grapes, peaches, plums, prunes and orange juice showed smaller gains. Orange juice concentrate stocks were down to 93 million pounds, reflecting a net withdrawal of 15 million pounds.

A greater than average increase in frozen vegetables brought August 1 holdings to 275 million pounds. The seasonal increase of 40 million pounds compares with the average increase for the 5-year period ended 1949, of 39 million pounds and 18 million pounds reported last year. Stocks on hand August 1 were only 31 million pounds below the record high (1947) for this time of year. Four frozen vegetables did, however, exceed all previous records for stocks on hand this time of year. They are as follows: lima beans, snap beans, broccoli, Brussels sprouts and spinach.

Cream storage holdings on August 1 were about a fourth of average for this time of year. Creamery butter moved into storage by about a third greater than average. Since July 1 storage holdings of butter increased by 45 million pounds and by July 31, 231 million pounds were in the nation's refrigerated warehouses. Of this total in storage, almost 70 percent was reported to be Government owned. More than three-fourths of all the butter in storage was held in the East and West North Central States. The latter held 91 million pounds, most of which was in Minnesota, and the former, 88 million primarily in Illinois storages.

Total cheese in storage increased 31 million pounds since July 1, 30 million pounds of which was accounted for by the increase in cheddar cheese holdings. Of the 286 million pounds of cheese in storage, American cheddar amounted to 260 million pounds, the second highest on record for this time of year.

Shell eggs in storage were reduced by 500,000 cases since July 1, and only 3.2 million cases were on hand at the close of business July 31. This compares with 5.4 million cases, average for this time of year, and last year's stocks of 1.9 million cases.

Frozen egg holdings were down to 175 million pounds by August 1, reflecting a seasonal net withdrawal of 13 million pounds—the greatest net reduction ever recorded for this time of year.

Poultry stocks at 103 million pounds were 21 million pounds below average for this time of year. August 1 holdings reflected a seasonal net withdrawal of 19 million pounds with the greatest net reduction in poultry being reported in turkey stocks. Since July 1, 18 million pounds of turkeys moved from storage leaving 46 million pounds on hand July 31.

Beef in storage on August 1 was relatively unchanged from a month earlier. The 60 million pounds in storage, were, however, 8 million pounds below the stocks of a year ago and were only a little more than half the average supply for this time of year. Pork moved out of storage in greater than average amounts during July. The net reduction in pork stocks was more than twice the average withdrawal for this time of year and by August 1 stocks on hand totaled 396 million pounds. This compares with 367 million pounds in storage last year and average holdings of 370 million pounds.

Frozen pork totaled 191 million pounds on August 1—a net reduction of 58 million pounds since July 1. Lard and rendered pork fat in storage totaled 117 million pounds on August 1, about average for this time of year but 21 million pounds above the stocks of a year ago. During July, approximately 19 million pounds moved from storage which was in contrast to the average change for this time of year of a 5 million pound increase.

Storage stocks of frozen fishery products increased approximately 10 million pounds during July, bringing stocks on hand to 127 million pounds. Cured fishery products in storage at 27 million pounds raised total stocks of fishery products to 154 million pounds. This was about equal to the holdings a year ago.

Storage Outlook

The expected increase in public cooler occupancy during July failed to materialize despite a significant increase in cheese stocks. Shell eggs which moved out of cooler storage in greater than average amounts during July may account for public cooler occupancy remaining unchanged from July 1. This was not the first time cooler occupancy did not rise during July. During the 5-year period ended 1947, there was no increase in cooler occupancy during this time of year even though the upward cycle was prevailing.

With the advent of the apple and pear storage season, coolers next month should be utilized to a greater extent than on August 1 and notwithstanding the continued withdrawals of shell eggs, it is likely that cooler occupancy on August 31 will be greater than the occupancy of 60 percent reported on August 1. Freezer occupancy in public warehouses increased according to the seasonal pattern and in magnitude indicated by the 5-year trend. Continued into storage movement of frozen fruits and vegetables should be reflected in a higher occupancy for August 31. Should the historical pattern prevail, freezer occupancy next month should be one to three points above the August 1 level.

Monograph by United Nations Summarizes Information on Refrigeration of Foods

A MONOGRAPH on the refrigeration and freezing of foods has been published by the Food and Agricultural Organization of the United Nations as a direct outgrowth of a technical meeting on the refrigeration and storage of food which convened in Europe in October 1948 at the request of a number of member governments. The meeting was held in response to requests for expert assistance and recent information in this field from a number of countries cut off from new developments during the war period. The meeting was attended by representatives from twelve European countries and was cast on a highly technical level with a view to providing specific scientific information and an opportunity for full discussion of a number of new techniques in the whole field of refrigeration and freezing of food.

The publication is an attempt to summarize and synthesize the major portion of the valuable scientific information made available by lectures and discussions at this meeting. Some of the information contained in this publication will be new to workers in this field and some will not. What makes the publication valuable, however, is the effort to bring together the food freezing and refrigeration problems the European countries contend with and some of the most recent technological developments. The publication retains the same technical approach as the meeting and is therefore of value primarily to technical and professional people working in these fields. It does not attempt to be exhaustive and limits itself exclusively to the subjects and information discussed at the meeting.

The publication is divided into the following chapters:

CHAPTER I—"Principles of Refrigeration": Importance of rapid freezing; the freezing of fruits; the freezing of vegetables; storage temperatures for frozen foods; packaging.

CHAPTER II—"Ice—Production and Use": ice-making systems ("Flak Ice", "Pak Ice", "Scale Ice", ice blocks frozen in cans); uses of ice; dry ice.

CHAPTER III—"Household Refrigerators, "Home Freezers and Locker Plants": household refrigerators; home freezers; locker plants.

CHAPTER IV—"Construction of Cold Storage Plants": Practical considerations (site, building, subdivision of cold storages, insulation, temperatures and humidity, refrigerating machinery, accessory parts, costs); problems (humidity, location of coils, optimum amount of coil, freezers, cooling systems, refrigeration requirements and insulation, insulating materials and their properties, vapor barriers).

CHAPTER V—"Refrigeration Machinery": Compressors for refrigeration (ammonia compressors, valves, Freon compressors, lubricating oils, special specifications); other equipment (condensers, evaporators, cooling coils, expansion systems).

CHAPTER VI—"Methods and Apparatus for Commercial Freezing:" Freezing systems (freezing in contact with metallic surfaces, freezing on vacuum plates, sharp-freezing, the "Rotofroster", brine freezing, improved sharp-freezing processes, air-blast freezing systems); advantages of the various systems.

CHAPTER VII—"Packaging Materials and Machinery:" Water-vapor-proofness; testing water-vapor-permeability; air and flavor-proofness; temperature; moisture, rupture and acid resistance; mechanical strength; packing speed; metal containers; wholesale containers; shipping containers; testing shipping containers; standardization of package sizes; future trends.

CHAPTER VIII—"Judging Flavor, Color, and Texture of Foods:" Number of taste-testers; statistical analyses of results; selection of taste panels; taste-testing technique, score cards.

CHAPTER IX—"Plant Sanitation:" Government sanitary inspection; bacteriological examinations; sanitation of equipment; in-plant chlorination.

CHAPTER X—"Chilled and Frozen Foods:" Chilled and frozen dairy products (cooling milk on the farm, cooling in dairy plants, refrigerated transport of milk, cooling cream for butter, cold storage of butter, cheese storage); chilled and frozen lean fish (chilling, freezing, practical freezing problems); chilled and frozen fatty fish (rancidity in frozen herring, fundamental characteristics of herring oil, the effect of catalysts, the effect of common salt, the effect of glazing, the effect of drying, conclusions); frozen shellfish (shrimp, lobsters, mussels, oysters); refrigeration of fruits and vegetables at temperatures above freezing (refrigeration, the icing method, gas storage, use of germicidal agents, dessication, prepackaging, waxing, fungus diseases, effect of growing conditions, limitations, losses in practice); refrigerated gas-storage of fruit (gas storage, importance of maturity of fruit, control of scald); frozen fruits and vegetables (vegetables, fruits, specifications—vegetables, fruits—, packing of frozen products, freezing processes, distribution of refrigerated products—need for a refrigerated chain, stages in distribution, storage, retail stores, trade organization, selling the products,—the Helgerud process); meat and meat products ("fresh" meat, "chilled" meat, bulk-frozen meat, freezing meat cuts); chilled and frozen poultry (cold-storage poultry, chilled poultry, preparation for freezing, freezing, storage temperatures, packaging, broilers, storage changes, chilling and freezing poultry in Denmark); miscellaneous frozen products (grape juice, orange juice, fruit purees, cooked and baked products).

CHAPTER XI—"Transportation of Chilled and Frozen Foods in Europe:" The standard refrigerator car; the refrigerated train; the dynamo-ventilator car; the rolling cold-store; refrigerated trucks.

CHAPTER XII—"Marketing Frozen Foods in Europe:" Technology of marketing; the importance of quality; marketing difficulties (distribution among countries); prices; need for co-operation.

Conversion Factors.

Pacific States Association Meets

THIRTY-THREE members of the Pacific States Cold Storage Warehousemens' Association assembled at the Fairmont Hotel, San Francisco for their quarterly meeting July 6 and 7. With President Harlan J. Nissen presiding the meeting considered: inspection certificates covering egg products imported from other states; personal property taxes; uniform cost-finding procedures; refrigerated trucks; cold storage for the armed forces; and tariff matters under regulation by the California Warehouse Tariff Bureau.

Eighth International Refrigeration Congress

THE Eighth International Refrigeration Congress will be held in London, England August 29 to September 11, 1951. English scientists J. F. Joule and Lord Kelvin will be honored for achievements of the mid-nineteenth century. An extensive technical program has been planned, involving basic and applied research.

Research on Cheese Develops Information on Desirable Storage Standards

A BULLETIN giving the latest information on the subject of cheese storage has been issued by The Refrigeration Research Foundation. Fifty years ago the question of appropriate temperature for the curing of American or Cheddar cheese was a subject of great interest, and extensive experiments over a number of years established the commercial practice of cold curing and storage. Refrigerated warehouses in cheese-producing areas accumulate large quantities of cheese from factories and from these it moves to other refrigerated warehouses in various centers in the course of marketing. Adequate ripening under these conditions ordinarily requires about six months.

So-called "shelf-curing" (at 60 F for three to four months) produces Cheddar cheese with a special type of sharp flavor which appeals to a limited market. For self-curing, cheeses are carefully selected and are turned at specified intervals. This method is considered profitable if and when losses from shrinkage and insects are prevented and when a premium market exists for it to cover extra expense as compared with cold curing (at temperatures under 40°F.). The flavor desired in shelf-cured cheese requires use of unpasteurized milk; pasteurized milk gives a high flavor but one that is not comparable with that obtained when unpasteurized milk is used. After it has been fully ripened, shelf-cured cheese is stored under the same conditions used for cold-cured cheese.

The advantages of low-temperature curing (well below 40 F) are as follows:

1—No loss from insect infestation (temperatures below 40 F stop insects. The highly destructive cheese mite may, however, cause trouble at temperatures above 32 F).

2—Minimum shrinkage.

3—Special humidity control in commercial storage is seldom necessary.

4—Maximum use of storage space is obtained.

5—Cheese can be held 1 to 2 years without handling, with minimum selection of original stock, and minimum deterioration of grade.

The subject is summarized as follows:

1—In commercial cold storages cheese is usually held well under 40 F, with 32 F or slightly lower, as the usual recommendation. Freezing, which must be avoided for nearly all cheese types, occurs at about 28 F.

2—Humidity is usually held at around 60-70 percent. A fairly dry atmosphere with occasional ventilation is helpful if there is a tendency toward growth of mold on cases, or toward rind rot.

3—Since Cheddar is, or should be, well paraffined or packaged in pliofilm or its equivalent, and since mositure content for better grades is usually under 39 percent, humidity is not ordinarily a problem. Loss of weight might be encountered with very low humidity with some cheese. Swiss cheese is similarly protected by a rind developed by salting of the wheels during ripening.

4—Low temperature storage as outlined above will keep well manufactured cheese in good condition for as long as one to two years. Maintenance of temperature and humidity limits is advisable, however, to aid in avoidance of molds, rind rot, and mites.

5—Stacking of cheese in round wooden boxes is not ordinarily a problem so far as ventilation and stability of the stacks are concerned. When stacked seven or eight boxes high, there may be danger of lenage, or actual falling, if broken or cracked boxes are stacked in the lower part of a pile. If containers other than wood are used, careful attention must be given to stacking, to provide adequate ventilation (avoid heating), and to avoid cracking and deformation of the cheese. Small styles should have the same attention to weight distribution, ventilation, etc., as the round Cheddar styles.

6—Although there is probably little danger of contamination of cheese with odors or other products, it is well to maintain the atmosphere free from such odors.

Canadian Holdings of Fruits and Vegetables

THE Dominion Bureau of Statistics, Ottawa, Canada, reports that the total stock of all fruit, frozen and in preservatives for July 1, 1950, amounted to 18,877,000 lbs. as compared with 30,080,000 lbs. last year and 17,188,000 lbs. last month.

Frozen vegetables amounted to 4,727,000 lbs. as compared to 5,401,000 lbs. June 1 and 5,441,000 lbs. on July 1, 1949.

Refrigerated Apple Trees Bloom at Convention

THE 56th Annual Convention of the International Apple Association was a unique affair. Besides effective programming and well-executed arrangements, a special feature which brought many oh's and ah's from the throats of the delegates and regular Washington Statler Hotel guests was apple trees in full bloom in August! The Convention was held at the Statler Hotel, Washington, the week of August 7.

This apple tree, grown at Geneseo, N. Y., was held dormant under cold storage by The Terminal Refrigerating and Warehouse Corp., Washington, D. C., until transplanted for blooming in the lobby of Statler Hotel in Washington. It was only one of several similar apple trees in full bloom.

How was it done? The trees were grown by Sam Fraser, IAA Secretary, at Geneseo, N. Y. They were cut and sent to Washington in February where they were scientifically stored in a modern refrigerated warehouse. Reposing comfortably in a specifically designated degree of temperature and humidity, the frustrated fruit trees again felt the warmth of Washington sunshine in early August when they were "planted" in the lobby of the Statler Hotel. Smilingly beginning to bloom, the delicate blossoms opened wider and wider and were soon in full bloom.

This is one example of the constant advances by refrigerated warehouse operators in the storing of, not only perishable foods, but other products—which included apple trees in full bloom.

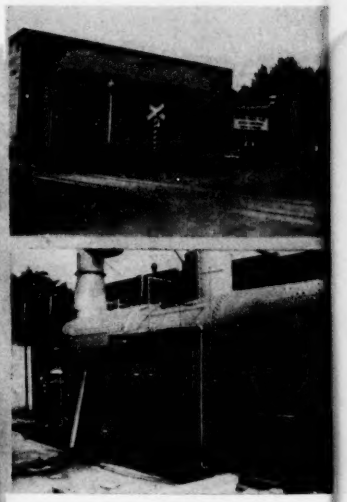
FREEZE PLANT SPEEDS PROCESSING

Modern equipment and efficient layout of new plant make possible plans to pack four million pounds of fruits and vegetables per year for next eight years.

THE new Prosser Freeze Plant at Prosser, Wash., which started operations in the fall of 1949 processed 2,740,000 pounds of produce last season, freezing as high as 80,000 pounds a day. Plans call for a minimum pack of four million pounds per year for the next eight years. It represents, in plant and equipment, an investment of approximately a quarter of a million dollars. It was designed, engineered and built by C. C. Andrews, owner and manager.

The plant, financed by local capital, was originally started in 1946. Last year a modern concrete block food processing plant was added to the storage plant which has a capacity for 2000 tons storage, with modern refrigerating equipment and fork lift trucks. The food plant is equipped with 125 hp steam boiler and other machinery necessary for processing vegetables and fruits. Equipment is available for handling asparagus, peaches, cherries, apricots, corn, lima beans, peas, spinach and apples. The plant has been leased for a period of eight years to George Mick and Warren McGrath, doing business as Prosser Packers, Inc. Although their lease did not start until January 1, 1950, the building was rushed to completion so that operations might start in 1949.

Below: End and side views of new Prosser Freeze Plant, Prosser, Wash.



Above: Storage, office, engine room and boiler in new Prosser freeze plant.

The Warehouse

The warehouse part of the plant was originally built for an apple storage. The building is 80 feet wide by 112 feet long, two floors with eleven ft. ceilings. This building was purchased in 1946 and rebuilt. It is of frame construction, insulated with 12 inches of shavings with a vapor seal under the outside walls. First floor is car platform height and each floor has a carrying capacity of 1,000 tons and a load capacity of approximately 900 tons. Additional insulation is provided in the walls with four inches of rock wool. This was done by leaving the old walls as they were and constructing a new wall with a 4 inch space.

The first floor has 12 inches of Rock Wool between the 6x12 inch floor. Joists are placed on 24 inch centers. The underside has a heavy paper vapor seal and is sheeted with one inch of Celotex. The second floor has 12 inches of shavings between the 6x12 inch floor joists. The ceiling has three to four feet of planer shavings and a flat type roof.

The second floor is served with a three ton hydraulic elevator. This was a home-made device made by turning an 8 inch length of pipe for the plunger and using a 10 inch pipe for the casing and a 15 hp motor on a gear type Worthington pump. It requires approximately 125 pounds to lift the elevator when loaded.

Storage and Freezing Rooms

The storage and freezing room are equipped with aluminum fin type coils and have a total of 60 hp on the fans that move the air. Auxiliary units are also provided in the storage rooms so that there may be no interruption in the temperature which is held at 10 degrees below zero.

Each room is served by two ten ton Drayer-Hanson evaporator blower units, fans have 5 hp motors, and one unit in each room is equipped with a back pressure valve which enables maintenance of any desired temperature. These units are set in opposite corners of the room, one being used as an auxiliary. Three air ducts run from one unit and connect to the other, one going through the center of the room and the others near each wall with air outlets on both sides of the ducts. The evaporative unit near the warehouse door has a 16x32 ft. room built around it and the air ducts have gates so the air can be discharged in this small room which provides a quick freeze chamber on each floor of approximately five tons capacity each. This provides a standby in case something should go wrong with the other unit.

Handling Equipment

Pallets 3x3½ feet square are used with a "Hyster" fork lift truck of a ton capacity. The average load per pallet is 53 cases of 24/12 and these are stacked two high. The rooms are laid out in blocks of 16x40 ft. and are designated by letters, running from A to M. Each room takes four rows of pallets consisting of 20 or 22 pallets to the row.

These rooms are served by motor driven mechanically operated doors with flapper doors on the inside. Main doors are of the overlap type. All doors are operated by a 3-phase motor with a two-way switch. Control buttons are mounted on ceilings back about 15 feet from door, both inside and outside the room. Three chains hang from a lever that contacts push buttons to make contact to energize the motor. A novel feature in the storage rooms is the doors operated by a chain switch. These permit the operator of the fork lift truck to open the doors, pass through and close them without making a stop, which means a saving of both refrigeration and labor time.

Platforms

The platforms are of concrete construction and along the front side is a one inch steel bar supported 2 inches out beyond platform and ½ inch lower. When loading cars or trucks a ½ inch reinforced steel plate is laid on this bar to railroad car or truck which makes a level surface for the lift trucks. When loading large trucks or railroad cars the fork lift is driven straight in and pallets are set down on an angle iron frame. That in turn sets on an ordinary 12 inch wide section of box rolls. These sections are laid with the rolls up lengthwise of car and one man can easily push a ¾ ton load to the end of car. As the load builds toward the door, sections of rollers are removed. With this method two men, one in car and one on a fork lift can remove from the warehouse and load an ordinary railroad car with case goods in two hours.

The property is surrounded by 475 feet of private railroad siding, and 130 feet of platform are on this siding. The truck platform is back from the street far enough for a truck and trailer to back in and clear the street.

Freezer Room

The main quick freeze room is 20x48 ft. and equipped with two Drayer-Hamson evaporative units with 20 hp motors on squirrel cage fans moving 88,000 cubic feet of air per minute. The goods are frozen on screens, three feet square and self racking. In tiers of 16 high they are handled with a fork lift truck.

All of the evaporative units are defrosted by fresh water from the condenser overflow and a 3 hp. pump. When defrosting these the liquid ammonia feed to the unit is cut off and a one inch valve from the bottom of the unit coil is opened. This dumps liquid ammonia from the coil into a tank that is lower than the units. This serves two purposes: first it permits turning the water on immediately, therefore, it requires only about 20 minutes to shut the unit off, defrost and get back on the line; secondly by dumping, the units are kept free of oil and operating at their maximum efficiency.

All of the evaporator units are equipped with No. 300 Phillips floats and in the large units two floats are used in each surge drum. This is done to standardize on No. 300 size. Also to keep the Phillips floats free of oil under low temperature a ½ inch line, bringing hot gas from engine room to each unit is connected to the opposite side of float from liquid entrance. During defrosting periods this hot gas is opened to float and blow out any oil that might be potential trouble when the freeze rooms drop to 50 below zero.

The engine room is constructed of concrete blocks. It is 40 feet wide x 52 feet long 18 foot ceiling and self-supporting arch roof designed for 6 compressors and five boosters. Through the center of the room near the ceiling the pipe lines, conduit and water intercooler are supported on steel columns. This includes an eight inch suction line from the warehouse. This line is stubbed out through the present warehouse for a larger warehouse that might be needed in the future and for which ground space has been left. There is also a 10 inch line to freeze room which is stubbed out for expansion. Also included are an 8 inch discharge line from compressors to condenser, a 10 inch line that will serve all five boosters when needed, a 10 inch line from water intercooler to gas intercooler and a 16x16 ft. shell and tube water intercooler, water lines and conduit lines.

The engine room is equipped with two 8x8 Worthington compressors with 75 hp General Electric synchronous motors mounted directly on the ice machine shaft operating at 400 rpm with 440 current, excited by 2 hp horsepower motor driven exciter. Machines are equipped with Mercoid controls for low oil pressure and high head pressure, and a Mercoid tube mounted for jacket water control. With this equipment, the machines will stop with excess head pressure, low oil pressure, or if jacket water is not turned on or fails. These machines have a capacity of 57 tons each with 35 pounds back pressure. Two of these machines are operating now and another is being installed.

Two boosters are of the Rotovane type direct connected to 50 and 60 hp motors respectively. Both operate at 900 rpm. With these two boosters and the two 8x8 compressors, 40 tons of lima beans per day are frozen on screens and temperatures are maintained in the warehouse. This room is designed for expansion, the piping and electrical installations being sufficient to accommodate 11 machines with a capacity of freezing 100 tons per day and a storage capacity of 5000 tons.

The condenser is a Frick 250 ton capacity shell and tube, mounted on a steel rack with provisions for another. The receiver built by Harris Ice Machine Co. of Portland is a 26 in. x 20 ft. with provision for another in the steel frame. The receiver is equipped with two safety relief valves so arranged that only one can be closed at a time. An Armstrong foul gas purger is used. Piping construction is all welded.

The enclosed switchboard furnished by Westinghouse is installed for present and future machines with an independent circuit to every motor in the plant and with 2000 amp main breaker.

Water Supply

The plant has its own water well which supplies 208 gallons per minute on a 24-hour day operation. The processing plant uses city water and when operating uses as much water as the entire city. To take care of this demand for industrial usage the City of Prosser put down a new well in 1948 which gives a sufficient supply of water for an increased population, which would mean greater domestic consumption and also an increase in industrial usage. The plant well is 60 inches in diameter and 35 feet deep which supplies sufficient water of 58 degrees, allowing a head pressure of 110 to 140 pounds.

Condenser water is disposed of in a concrete box connected to a 12 inch concrete drain line to the river about 1000 feet away. In this concrete box are installed three electrodes in steps of about 3 in. This provides constant control of water supply. In case something should happen to the well pump and the water level drops in the concrete box it ceases to ground the center electrode, this action opens an electrically operated water valve on the city water line. Should something happen that the city water does not start, as the water level continues to fall in the box, the lower electrode will shut down all compressors. The top electrode shuts off the city water when well pump is started. This equipment was specially designed.

The gauge board is a marble slab mounted on the wall of the engine room with an electric clock at top of board, high and low pressure gauges for compressors, also for boosters. At the bottom of this gauge board are Powers 24-hour recording temperature charts for the rooms.

Food Processing Building

The food processing building is of concrete block construction, 40 ft. wide and 128 ft. long, with 18 ft. ceiling, roof supported by 16 in. I beams. The floor on ground level is concrete; covered outside concrete L shaped platform is truck height; inside platform across the building is same height as outside platform. From this platform all produce starts through the processing line.

Along one inside wall is a 30 in. x 70 ft wire mesh combination inspection, blanching cooling belt. Through this line are run such products as asparagus, apricots and peaches. On the opposite side of the processing room is the pea and lima bean line, consisting of mill, washer, hot water blancher and quality grader. In the center of room are the picking tables, two wrapping machines, etc. Equipment in center of room can be rearranged for different commodities. Adjacent to the processing building is a 180 hp fire tube boiler (Oilwell type) with fully automatic Ray burner, which furnishes steam for processing. A revolving 40 mesh screen waste disposal plant also is adjacent, all waste water being connected with city sewer.

A one ton Hyster fork lift truck handles freezer screens to and from freezing chambers.

Food Processing Meeting

THE third annual food processing meeting to be held at the New York State Experiment Station at Geneva, N. Y., is scheduled for Wednesday, November 15.

Frozen Foods

The meeting is sponsored by the Division of Food Science and Technology at the Experiment Station and the program is designed primarily to review progress in the Station's food research. All research personnel of processing and related industries are cordially invited to participate.

Details of the program will be announced later, but present plans call for presentation of results of fundamental research in progress at Geneva on food processing, including some of the current studies on frozen foods, tomato products, and a variety of other investigations in food preservation.

Refrigerated Cars Offer Quick Transit for Frozen Concentrated Orange Juice

One of the new series of Fruit Growers Express cars equipped with automatic refrigeration unit to be used chiefly for hauling frozen concentrated orange juice from Florida to Eastern and Midwest markets.

ELEVEN refrigerator cars equipped with gasoline-driven automatic refrigeration units were scheduled for delivery August 1 to the Fruit Growers Express Co., owned by railroads operating in the South and East.

United States Thermo Control Co., Minneapolis, manufacturer of the refrigeration units, announced July 19 that their installation marks a new era in food transportation and the end of long technical battle to make refrigeration units "small, rugged and powerful enough" to use on railroad cars.

It was revealed that the first 11 cars will be used chiefly in hauling frozen concentrated orange juice from Florida to large Eastern and Midwest markets. At present, most of that and other frozen food products are moved by trucks, although there is some movement by rail when packed in dry ice.

Automatic controls enable the interior of the new-type car to be kept at any point from 20 degrees below zero to 65 degrees Fahrenheit. If the outside temperature should decline to a point where it is necessary to heat the interior of the car rather than cool it, the heating unit takes over and maintains temperature in the car at the desired level.

During the last two years, several cars equipped with this type of mechanical refrigeration have been operated experimentally in both Canada and the United States. These experiments resulted in the decision by the Fruit Growers Express to equip 11 of its cars with these units.

Description and advantages of the Thermo Control refrigeration system were given in an article in the February, 1950 issue of ICE AND REFRIGERATION.

Frozen Foods

Orange Concentrate Standards Revised

NEW standards for frozen concentrated orange juice, as suggested by the Production and Marketing Administration and worked out in cooperation with the frozen food industry, will be issued by the United States Department of Agriculture. A tentative revision of previous standards for the product was issued early in July, and packers were given 30 days in which to file exceptions. Final standards will be announced early this fall.

PMA has also published new standards for quick frozen okra, for frozen broccoli, and for frozen corn on the cob. All these latter standards have been issued in final form. The Agriculture Department's standards are issued for grading purposes, and are not to be confused with mandatory standards of quality, identity, etc. issued by the Federal Food and Drug Administration. The latter agency has not yet issued any final standards for frozen vegetables or for frozen fruit concentrates.

Meanwhile, PMA officials have also announced that proposed permissive standards for frozen grapefruit juice and frozen blended orange-grapefruit juice will not be published until next season. This followed consultations between the PMA and members of the National Association of Frozen Food Packers.

Frozen Concentrated Orange Juice Increases Sales

HOUSEHOLD consumer purchases of frozen concentrated orange juice, which a year ago accounted for only five percent of the total orange and orange product purchases for home consumption, now account for 19 percent of total purchases, the U. S. Department of Agriculture said in a recent news release.

This trend is reported as a result of studies of household consumer buying practices in the purchase of several fruits and juices, made by the Fruit and Vegetable Branch of the Production and Marketing Administration and the Bureau of Agricultural Economics, in cooperation with fruit industry groups which bore half the costs of data collection. The studies are based on data obtained by the Industrial Surveys Company, Inc., under contract with the Department, as authorized by the Research and Marketing Act. Purpose of the studies is to supply producers and shippers with data on which to base their marketing decisions.

Products covered in the studies are fresh oranges, grapefruit, lemons, tangerines, and limes; canned single-strength citrus juices; canned tomato, prune, pineapple, grape, apple, and combination vegetable juices; frozen concentrated juices; and the following dried fruits: raisins, prunes, figs, dates, apricots, apples, peaches, pears, and mixed dried fruits.

Accompanying the increase in purchases of frozen concentrated orange juice is a reduction in the relative volume of household purchases of fresh oranges and canned single-strength orange juice. Fresh orange purchases accounted for 62 percent of all orange and orange product purchases (fresh orange basis) in the first quarter of 1949, but in the first quarter of 1950 this had declined to 56 percent. Similarly, purchases of canned orange juice, which in the first quarter of 1949 represented 32 percent of total orange purchases, declined in the first quarter of 1950 to 25 percent.

Locker Plants Popular in Western Canada

GROWING at the rate of nearly 25 percent a year, the number of quick freeze locker plants now in operation or under construction in western Canada is approximately 425, according to the latest figures. Of this number Manitoba has 120, Saskatchewan 160 and Alberta 145. In the West alone these plants now represent a $10,000,000 industry.

Manitoba started off this year with approximately 100 establishments of this kind, but another 20 have been completed or are in the course of erection. Virtually all of them serve the rural areas. The patrons, mostly farmers, number some 40,000 in this province.

Perhaps because conveniences of this kind are now going into the homes, city people in western Canada are not making use of locker plants to any great extent. Thus in Winnipeg there are only four such establishments while in Portland, Oregon, a city of similar size, there are over 250.

The popularity of these locker facilities in western Canadian rural areas run far behind what it does in the United States. Over the border more than half of the 6,000,000 U. S. farm families keep food frozen in community locker plants, and the number is growing rapidly all the time.

The first frozen food locker plant short course ever to be held in Canada was put on in the University of Alberta in Edmonton in June. It is estimated that 80 per cent of the farm families make use of such facilities in the foothills province. Ninety per cent of the products which go into the lockers consists of meat of one kind or another.

Florida Concentrate Story Told in Magazine Article

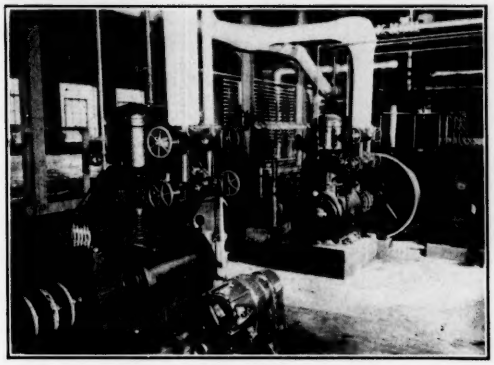
THE expanding frozen citrus concentrate industry in Florida is vividly described in a current issue of Collier's Magazine. The full-length feature article is entitled, "The Industry That Laid a Golden Egg," and is illustrated with color, also black and white photographs.

The industry is described as a "widening stream of icy gold that probably will never stop growing—one of the most fabulous items to reach the market in U. S. history." The author adds that 22 million gallons of it will flow into United States kitchens this year from 500 million frosty cans. Florida now grows more citrus than California, Texas and Arizona put together.

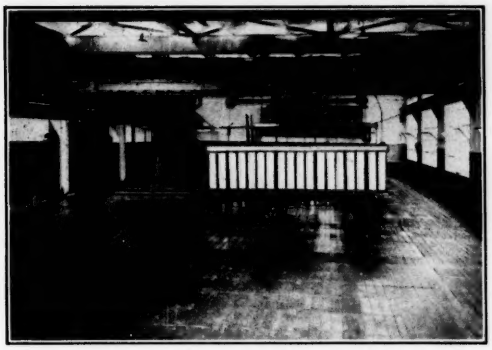
In distributing credit for starting the industry, the article says there are many claimants to that honor. The man who officially gets credit is Dr. L. G. McDowell, 39-year-old director of research for the Florida Citrus Commission. But many others, also, are being given credit for being pioneers in the concentrate research. High among this list is Dr. Arthur L. Stahl, now director of Tropical Food Research at the University of Miami.

Dr. Stahl did his pioneering work when he was a research chemist at the University of Florida a decade ago, and members of the citrus industry, it is reported, were horrified. They said it would ruin the industry. Dr. Stahl was pulled off the project but the article continues, "he was pulled off too late." He already had demonstrated way back then that concentrates need not be pasteurized and the taste ruined, and the Citrus Commission was aware that a new field had been tapped. Dr. Stahl believes that frozen concentrate can be produced in small and inexpensive processing plants.

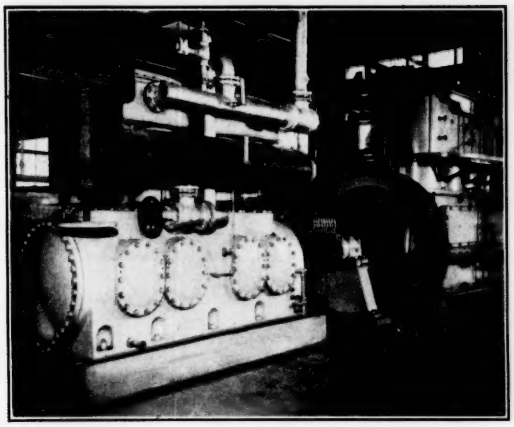
Two plants which first produced frozen orange concentrate on a commercial scale (in 1946) were Vacuum Foods Inc., at Plymouth and Pasco Packing Co. at Dade City.



Pair of 11 by 10 Frick Compressors, with 200-hp. Engines, at the Independent Ice Co., Raymondville, Texas.



These Two Tanks at Edinburg, Texas, Makes 300 to 340 Tons of Ice Daily. Note Use of Frick Can Grids.



Four-cylinder 14 by 12 Frick Compressor and 425-hp. Natural Gas Engine at the Edinburg (Texas) Ice and C.S. Co.

Showing Location of Frick Installations in the "Magic Valley" of the Rio Grande.

Lower Rio Grande Valley Served by Four FRICK Plants

The "Magic Valley" of the Lower Rio Grande extends 80 miles west of Brownsville, Texas. This rich area enjoys warm winters and extensive irrigation; its citrus fruits, early vegetables and cotton support 200,000 people.

For handling the vast shipments of fruits and early produce, including 60 per cent of the grapefruit raised in the U. S., refrigeration in large amounts is required.

In the last few years important ice-making plants have been erected at Raymondville, Edinburg and Matamoros, while a huge quick-freezer is in operation at Brownsville.

All these are Frick-equipped. The ice plants harvest nearly 500 tons a day.

Let Frick refrigerating, quick-freezing and ice-making equipment aid in solving your problems. Call in the nearest Frick Sales Engineer today.

DEPENDABLE REFRIGERATION SINCE 1882

FRICK CO.

WAYNESBORO, PENNA. U.S.A.

Also Builders of Power Farming and Sawmill Machinery.

Why Vending Stations Sell Ice

(Continued from page 28)

Time of Purchase

The interviews were distributed over a 10-hour period from 11:00 a.m. to 9.00 p.m. on weekdays and Saturdays, and a 4½-hour period from 9:00 a.m. to 1:30 p.m. on Sundays (the busiest hours for picnic use.) The following table shows the percentage of patronage in each of the hours covered during the survey:

Time	Percent of Total Customers Weekday	Saturday	Sunday
9:00			14.4
10:00			22.1
11:00	4.9	8.2	30.8
12:00	5.3	8.8	21.2
1:00	3.0	10.7	11.5
2:00	6.3	10.7	
3:00	7.3	8.9	
4:00	9.8	9.6	
5:00	18.2	14.3	
6:00	20.7	14.3	
7:00	15.9	10.9	
8:00	8.5	3.6	
	100	100	100

The peak hours on weekdays and Saturdays are 5:00 p.m. to 8:00 p.m. with the 6:00-7:00 hours the busiest. On Saturdays there is another peak in the early afternoon from 1:00 to 3:00 p.m.

No attempt was made to cover the evening hours on Sunday since the purpose on Sunday was to reach a large sampling of picnickers. The busiest hour for this trade is from 11:00 to 12:00 noon.

Heating and Ventilating Exposition January 22-26

THE 10th International Heating and Ventilating Exposition, also known as the Air Conditioning Exposition, will be held at the Commercial Museum in Philadelphia, Pa., January 22 to 26, 1951. The display will be under the auspices of the American Society of Heating and Ventilating Engineers and coincident with its annual meeting, the 57th, as have the preceding expositions under the same organization and management. Advance reservations by former exhibitors already account for a majority of the space, and the floor plans forecast the largest display of its kind that has ever been held. The exposition is under the management of the International Exposition Company, with permanent headquarters at 480 Lexington Ave., New York.

Modernization Pays Off

(Continued from page 19)

tion in cooperation with the University of Florida Extension Service in sponsoring the ice manufacturers short course of instruction which was attended by Mr. Gramling's superintendent, chief operator, first shift operator as well as himself. He suggests that these short operating courses are a good investment for all small plant operators and does not hesitate to say that they have saved his plant many dollars.

As a result of Mr. Baker's survey, his recommendations and instructions along with attendance at the training schools, the power requirements in the plant have been reduced from 90 kw per ton to 61 kw per ton for the first six months of operation for 1950. Capacity has been increased from approximately 90 percent to over 103 percent in the same period. Power demand has been reduced from an average of 122 kw to 106 kw.

While Mr. Gramling states that they are well satisfied with the progress made, there is still a number of things to be done to place the plant in first class condition. For example, the ice tanks need reinsulating and a flooded system to feed the shell cooler. The water system, he believes, will require a lime alum treating plant. A definite plan of maintenance and repair has been established to take care of these changes.

Warehouse Modernized

(Continued from page 14)

ceiver, under the control of two float switches. This pump is also used for charging ammonia into the system.

There are two brine circulating systems; the first serves one house and the other two storage houses. Using a suction pressure of 10-lb. gauge, the coolers lower the temperature of the calcium-chloride brine from zero to minus 5 F. Six centrifugal pumps are installed to circulate varying amounts of brine according to requirements. A duplex strainer is installed in each brine circulating system.

There are two ammonia receivers, each 36 in. diameter and 18 ft. long; like the other pressure vessels these are equipped with dual safety relief valves. An electronic purger is mounted above the receiver. Auxiliaries include six oil drain pots measuring 12 by 48 in., nine Precision thermometers, a high-pressure cutout, two Brown 2-pen thermometers and eight recording thermometers, six large brine check valves, a 12-in. clock, a 10-in. gas and a 5-in. liquid header, supply of compressor oil, etc.

New Refrigerator Cars To Be Built

IN A big car building program at the Milwaukee Railroad shops in Milwaukee, the company has included 600 new refrigerator cars, the work on which is to be started in September. Materials for these cars was ordered weeks before the program was started, and, according to car shop superintendent Joseph Deppe, the refrigerator construction program is the first of any size in recent years.

Two hundred men have been hired for this program, he says. Intensive work on the refrigerator cars is now possible, the superintendent says, as a larger construction program, involving 2,000 gondola cars was completed some months ago, so that now full speed ahead has been given on the 600 new refrigerator cars. A big repair program, on old cars, is also being pushed, Deppe said.

The production of 1,100 refrigerator cars has been ordered by The Fruit Growers Express Company of Washington, D. C. for service in transporting Florida fruit. This will augment 250 which are now available in the state.

Retention of B Vitamins In Frozen Pork

COMPREHENSIVE data are available now on retention of B vitamins (thiamine, riboflavin, pantothenic acid and nicotinic acid) for pork, double-wrapped in locker paper and stored for various periods at plus 10 to minus 20 F. This work was done under The Refrigeration Research Foundation Project No. 11 at Kansas State College, Manhattan, with Dr. Gladys E. Vail as leader. On the whole, the results look fairly satisfactory for all temperatures except plus 10 F. There was appreciable improvement in some cases for the sub-zero storage, particularly for the longer periods of storage.

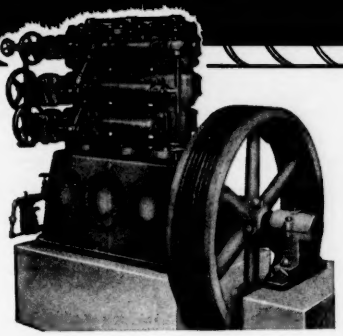
Whale Meat—Frozen

FORMERLY considered a "last resort" food, the 1600 tons of frozen whale meat recently distributed in Scotland is said to have had better quality and to have been found palatable sliced thin and eaten with fried potatoes and onions. Estimates indicate that enough is thrown away in Antarctica annually to feed Europe for three months. Freezing on board vessels is suggested.—(World Fisheries Abstracts, Food and Agricultural Organization of United Nations, Jan.-Feb., 1950).

A CASE OF SIMPLE ARITHMETIC

1 EQUALS 2

Here's HOWE...



CUT COSTS! SAVE 4 WAYS!

You get 2 compressors in one when you get a Howe Multiple Effect Compressor. Operating on both high and low temperature work, this compressor does the job of two standard units . . . with an average power saving of 35%! You have only one installation charge. Maintenance costs . . . working parts same as standard compressor . . . and space requirements are also reduced 50%! Capacity is increased with lower h.p. per ton. The Howe Multiple Effect Compressor affords more plant flexibility with minimum equipment expenditures!

Over 38 years of specialized, field-tested "know-how," Howe produces equipment that assures the constant exact humidity and temperature control necessary to keep your products at top profit-producing quality. Consult Howe engineers—no obligation, of course.

Read what a Texas user writes—

"Well, Sir! Your 3-cylinder 9" x 9" is doing the same amount of work on the Low suction as do either of the 12" x 12" compressors, and then goes right on and makes 24 tons of ice every 24 hours on the MULTIPLE EFFECT at practically no extra cost! All this is done on present equipment, which was already on 100% load, and with no extra ice making machinery added. At wholesale prices this is approximately $3000 per month. Incredible! What other system could do anything anywhere near like this? And on top of all the rest, the compressor is very quiet in operation."*

**Letter on file.*

HOWE

ICE MACHINE CO.

Distributors in Principal Cities Cable Address: Himco, Chicago

2829 Montrose Avenue Chicago 18, Illinois

Write for details about available distributor territories. Your inquiry is invited.

Put your finger on

Savings

WHEN YOU BUILD WITH... SMOOTH CEILINGS SYSTEM

SAVE with refrigeration pipes installed easily at lower cost. They are closer together for more efficiency in your refrigerating process.

SAVE by laying insulation before pouring concrete—eliminates costly application of insulation after floor has been poured. SAVES TIME TOO.

Above are two typical illustrations how one large Cold Storage and Warehouse Co. saved in their new plant . . . You can do the same.

SPECIAL STEEL GRILLAGES eliminate flared column caps, beams or drop panels and make these savings possible.

Write: FOR COMPLETE INFORMATION on this NEW STANDARD OF FLAT SLAB CONSTRUCTION.

SMOOTH CEILINGS SYSTEM

707 Metropolitan Life Bldg. Minneapolis 1, Minn.

Sales and Reorganizations

Jeffersonville, Ind.—The Serv-Ice Co. Inc. plant at Tenth and Wall Sts., has been sold to the Polar Ice and Fuel Co. of Indianapolis. The plant, started in 1923 to manufacture artificial ice for Jeffersonville and vicinity has gradually expanded through the years. G. A. Sayers, Indianapolis, is temporarily in charge, supplanting C. D. Knight.

Clarence, Mo. — Emmett "Tony" Johnston purchased the City Ice Co. from John E. Dennis recently.

Athens, Pa.—Max Cohen has purchased the building, the site, machinery and supplies of the Pure Ice Co., long established Athens plant that closed recently. Mr. Cohen will sell all the machinery and supplies but will retain the site and building pending further developments.

Springfield, Ga.—Perry M. Seckinger has acquired the Springfield Ice Plant from C. M. Boyles. The property includes a complete ice plant and meat curing, packing and storing facilities.

Mt. Carmel, Pa.—Joseph R. Aimetti has purchased the well known Mt. Carmel Brewery. Production was begun recently after improvements were made. The brewery has 80,000 barrel capacity.

New Kensington, Pa.—The Parnassas Ice & Storage Co., was advertised for sale recently. Land, buildings, and equipment were disposed of. The owners hoped to sell the plant as a going business to keep the industry in Kensington. The business was founded in 1922 by C. H. Dyer, R. L. Dyer, and Robert C. McKay of New Kensington, for $50,000. Its present value was reported to be $194,000. The present operators took over in 1932, with R. L. Dyer as president and his brother A. B. Dyer as vice-president. They are sons of the original founder.

Bryan, Tex. — O. H. McCollum, owner of the Citizens Ice Co. at Hearne, Tex., has announced the purchase of the Stephan Ice Co. here for $120,000. The name of the company has been changed to Bryan Ice Co. The Bryan plant produces 52 tons of ice a day.

New Incorporation

Baton Rouge, La.—Rock Ice Company, Inc., filed articles with the office of the secretary of state here, increasing its capital stock to $225,000.

CONVENTION CALENDAR

FLORIDA ICE ASSOCIATION
October 9-10, 1950
Columbus Hotel, Miami, Fla.
MURIEL WASHBURN, Secretary

NATIONAL ASSOCIATION OF ICE INDUSTRIES
October 31—November 3, 1950
Sherman Hotel, Chicago, Ill.
MOUNT TAYLOR, Executive Secretary

CANADIAN ASSOCIATION OF ICE INDUSTRIES
November 7-9, 1950
Chateau Frontenac Hotel,
Quebec City, Canada
MRS. MILDRED CROFT, Secretary

DELTA STATES ICE ASSOCIATION
November 13-15, 1950
Hotel Marion, Little Rock, Ark.
R. N. MILLING, Secretary

NATIONAL ASS'N. PRACTICAL REFRIGERATING ENGINEERS
November 28-December 1, 1950
Hollywood-Roosevelt Hotel,
Los Angeles, California
EMERSON BRANDT, Secretary

CALIFORNIA ASSOCIATION OF ICE INDUSTRIES
December 4-5, 1950
Fairmont Hotel, San Francisco, Cal.
JACK L. DAWSON, Exec. Mgr.

SOUTH CAROLINA ICE MANUFACTURERS ASSOCIATION
December 11-12, 1950
Columbia, S. C.
GEORGE L. ENGLISH, Secretary

MISSOURI ICE MANUFACTURERS ASSOCIATION
January 8-10, 1951
Hotel President, Kansas City, Mo.
V. A. ESPHORST, Secy-treas.

OHIO ASSOCIATION OF ICE INDUSTRIES
February 25-27, 1951
Deshler-Wallick Hotel, Columbus, O.
GUY W. JACOBS, Secretary

ASSOCIATION DIRECTORY

AMERICAN INSTITUTE OF REFRIGERATION
H. T. McDermott, Gen. Secretary, 433 N. Waller, Chicago 44, Ill.

NATIONAL ASSOCIATION OF ICE INDUSTRIES
Mount Taylor, Secy., 1706 L St., N. W., Washington 6, D. C.

NATIONAL ASSOCIATION OF REFRIGERATED WAREHOUSES
Wm. Dalton, Exec. Vice-Pres. Tower Bldg., Washington 5, D. C.

NATIONAL ASSOCIATION OF PRACTICAL REFRIGERATING ENGINEERS
Emerson A. Brandt, Secretary 435 N. Waller Ave., Chicago 44, Ill.

CALIFORNIA ASSOCIATION OF ICE INDUSTRIES
Jack L. Dawson, Secretary
461 Market St., San Francisco, Calif.

CANADIAN ASSOCIATION OF ICE INDUSTRIES
Mrs. Mildred E. Croft, Secretary
317 Eglinton Ave., Toronto, Canada

DELTA STATES ICE ASSOCIATION
R. N. Milling, Secretary
Ouachita Bank Bldg., Monroe, La.

EASTERN STATES ICE ASSOCIATION
Samuel Freer, Secy.-Treas.
12 So. 12th St., Philadelphia, Pa.

FLORIDA ICE ASSOCIATION
Muriel Washburn, Secretary
1926 Silver St., Jacksonville, Fla.

ILLINOIS ASSOCIATION OF ICE INDUSTRIES
W. D. Wright, Secretary
Clinton Pure Ice Co., Clinton, Ill.

INDIANA ASSOCIATION OF ICE INDUSTRIES
Robert W. Walton, Secretary
Board of Trade Bldg., Indianapolis, Ind.

KANSAS ASSOCIATION OF ICE INDUSTRIES
C. A. Berkhiser, Secretary
Manhattan Ice & Cold Storage Co.,
Manhattan, Kans.

KENTUCKY ICE MANUFACTURERS ASSOCIATION
R. T. King, Secretary
429 S. Seventh St., Louisville, Ky.

MICHIGAN ICE INDUSTRIES ASSOCIATION
Edward W. Jackson, Secretary
131 E. Kalamazoo Ave., Kalamazoo, Mich.

MISSOURI ICE MANUFACTURERS ASSOCIATION
V. A. Esphorst, Secretary
3820 Washington St., St. Louis, Mo.

MOUNTAIN STATES ASS'N OF ICE INDUSTRIES
J. R. Espy, Secretary
Espy Ice Co., 2229 - 15th St., Denver, Colo.

NEBRASKA ASSOCIATION OF ICE INDUSTRIES
Frank Vogelsang, Secretary
W. T. Good Ice Co., Lincoln, Nebr.

NEW ENGLAND ICE ASSOCIATION
Raymond Wilber, Secretary
83 Winter St., Providence, R. I.

NEW YORK STATE ASS'N REF. WAREHOUSES
Chas. G. Ashe, Secretary
161 Columbia St., Buffalo 5, N. Y.

NORTH CAROLINA ICE ASSOCIATION
Lewis H. Powell, Secretary
Capital Ice & Coal Co., Raleigh, N. C.

NORTHWEST ASSOCIATION OF ICE INDUSTRIES
Ed. H. Shea, Secretary
2027 N. E. Schuyler, Portland, Oreg.

OHIO ASSOCIATION OF ICE INDUSTRIES
Guy W. Jacobs, Secretary
The Steubenville Ice Co., Steubenville, O.

OKLAHOMA ASSOCIATION OF ICE INDUSTRIES
Harry T. Hudson, Executive Secretary
708-9 Perrine Building, Oklahoma City, Okla.

PACIFIC STATES COLD STORAGE WAREHOUSEMEN'S ASSOCIATION
Jack L. Dawson, Secretary
461 Market St., San Francisco, Calif.

SOUTH CAROLINA ICE MANUFACTURERS ASS'N
Geo. L. English, Secretary
P. O. Box 603, Columbia, S. C.

SOUTHERN ICE EXCHANGE
Richard W. Florrid, Secretary
$11\frac{1}{2}$ Forsyth St. N. W., Atlanta, Ga.

SOUTHWESTERN ICE MANUFACTURERS ASS'N
P. A. Weatherred, Secy. Counsel,
Mercantile Bank Bldg., Dallas, Tex.

TENNESSEE ICE MANUFACTURERS ASSOCIATION
W. E. Harlan, Secretary
Mt. Pleasant Ice Co., Mt. Pleasant, Tenn.

TRI-STATE ASSOCIATION OF ICE INDUSTRIES
L. R. Girton, Secretary
260 Boyce-Greeley Bldg., Sioux Falls, S.D.

VIRGINIA ICE MANUFACTURERS ASSOCIATION
H. H. Snyder, Secretary
Alexandria, Va.

WEST VIRGINIA ASSOCIATION OF ICE INDUSTRIES
E. Dana Smith, Secretary
Diamond Ice & Coal Co., Charleston,
W. Va.

WISCONSIN ASSOCIATION OF ICE INDUSTRIES
Paul F. Hoff, Secretary
1300 East Locust St., Milwaukee, Wis.

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Armour's Anhydrous Ammonia is pure and dry . . . free of moisture and non-condensable gases. And to insure trouble-free operations, every cylinder is tested and checked before shipping to give positive assurance of fine quality.

Remember, too, that fast shipment is an Armour byword. In fact, many customers receive their Armour's Anhydrous Ammonia the day it is ordered. 65 conveniently-located stock points are your assurance of receiving prompt shipment of Armour's Anhydrous Ammonia in either 50, 100 or 150 pound cylinders where you want it, when you want it and fast.

Please return empty cylinders!

ARMOUR *Ammonia Division*

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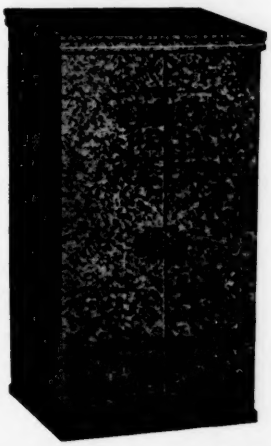
OHIO SPECIAL ICE CANS



Double Riveted
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Integral Tube Cans
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Can Baskets
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Industrial Trucks
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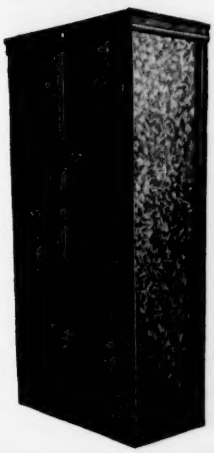
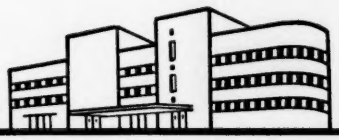


THE OHIO GALVANIZING & MFG. CO.

NILES — *Established 1902* — OHIO

NEW PLANTS and  IMPROVEMENTS

This Department each month presents the more important developments covering new constructions, as well as additions, improvements, remodeling, and installations of new equipment in ice and cold storage plants and other industrial plants that use refrigeration. News notes on all such new constructions and improvements are invited.

Alabama

Birmingham, Ala. — Birmingham Ice & Cold Storage Co. recently purchased a No. 209 Polar automatic station with two-belt vendor for vending cake and bag ice.

Birmingham, Ala.—The Southeastern Ice Corp. has purchased two, Models 20-B Polar vendors with two belts and a model 18-B three-belt Polar vendor.

Camp Hill, Ala.—The Tallapoosa Ice Co. has a No. 169 Polar station with a combination cake ice and bag ice vendor and a two-belt cake ice vendor here.

Prattville, Ala.—The Prattville Ice Co. has installed a model No. 2010 Polar station with two 2-belt vendors.

Arkansas

North Little Rock, Ark.—Sportsman's O..e Stop store here is operating a Polar Junior vending station.

California

Berkeley, Calif.—Newly Weds Baking Co. is using a completely self-contained, low-temperature, S & S Storage Depot. Used for storing ice cream products this 8x8x20 foot refrigerator was shipped by truck from the S & S Vending Machine Co. plant at San Jose. It includes a thermobank automatic defrost mechanism; a 2 hp compressor and blower condenser.

Los Angeles, Calif. — Jerseymaid Milk Products Co., Inc., announced the opening of its new modern frozen food warehouse here. This warehouse is devoted exclusively to frozen foods and provides 225000 cubic feet of subzero storage space.

Reedley, Calif.—The Nash-DeCamp packing house here has begun operating the new cold storage plant. The building contains three cold storage rooms with a total capacity of some 25,000 lugs or the equivalent of 30 railroad car loads. The storage rooms are equipped with bunkers that hold 45 tons of ice. The ice is supplied by the Reedley Ice Co. Announcement of construction of this plant was mentioned in the June, 1950, issue of ICE AND REFRIGERATION.

Florida

Marathon, Fla.—The Royal Palm Ice Co. is building an ice plant here. The building will be of concrete block stucco construction and will manufacture about 50 tons of ice daily. The plant will be driven with two diesel engines.

Miami, Fla.—The Royal Palm Ice Co. is operating two recently installed model 14 Polar vendors, one for cake ice and one for bag ice.

Idaho

Blackfoot, Idaho—Lloyd E. Stalker of Idaho Falls has been employed as architect by the state board of examiners to prepare plans for a cold storage building at the state hospital here.

Boise, Idaho—The Pacific Fruit and Produce Co. is constructing a new warehouse building north of Myrtle street near Broadway. The most modern equipment for quick, economical handling of merchandise will be installed, the officials said. Insulated rooms will be equipped with automatic temperature control devices for better safeguarding of perishables.

Illinois

Pleasant Hill, Ill.—Louisiana Ice & Cold Storage Co. has opened a No. 24 Polar refrigeration ice storage station here.

Indiana

Greensburg, Ind.—Greensburg Ice Co. is now using a new S & S ice vending machine, making 25 pound bags of crushed ice available on 24 hour automatic service.

Indiana

Indianapolis, Ind. — Irvington Ice Co. has installed two additional model No. 209 Polar stations with vendors for cake and bag ice.

Iowa

Charles City, Iowa—Artificial Ice Co. has a No. 2212 Polar vendor and the Hubbard Ice & Fuel Co. is operating two model No. 14 Polar vendors here.

Kansas

Coffeyville, Kans.—An 010 Polar station has been installed by the Page Milk Co. here.

Emporia, Kans.—Emporia Ice Co. has a model No. 20-B two-belt vendor in operation.

Kentucky

Crofton, Ky.—Kentucky Ice Service has a model No. 1610 Polar station operating here.

Louisiana

Tallulah, La.—The Tallulah Ice Co. recently installed an 1810 Polar station, two model 14 vendors and a model 724 storage box.

Zwolle, La.—The Gulf Public Service Co. purchased model 14 two-belt vendors for their plants here and at Breaux Bridge.

Massachusetts

Holyoke, Mass.—The Holyoke Ice Co. here has installed at Cray Ave. and Northampton St. a No. 189 Polar automatic ice vending station with two No. 18-B vendors.

Mississippi

Gulfport, Miss.—Biloxi Freezing Co. has opened a new automatic ice delivery station on the beach at Delauney street. The ice vending machine, a Polar, vends twelve pound bags of cubes in sacks ready for use in the home. It also vends twenty-five and fifty pounds of block ice.

Hattiesburg, Miss. — Southeastern Ice Co. has a model No. 16 Polar vendor with two belts in operation here.

Jackson, Miss.—The Capitol Ice Co. recently installed seven Polar vendors.

Leland, Miss.—The Leland Ice Co. has installed a model No. 209 Polar station with two vendors.

Missouri

Bowling Green, Mo. — Louisiana Ice & Cold Storage Co. installed a No. 1610 Polar station with two vendors for installation here and a 1410 Polar station with two vendors at Elsberry.

New York

Binghamton, N. Y.—Cutler Ice Co. has installed a new S & S vending machine, dispensing processed ice in bags.

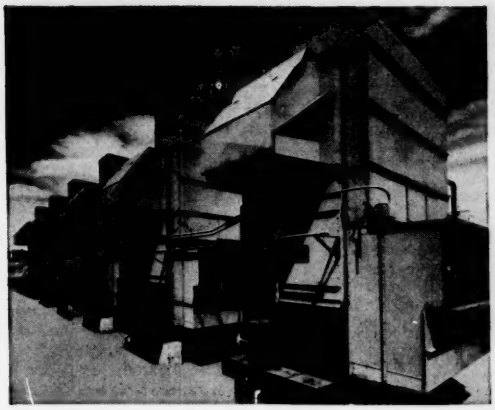
North Carolina

Charlotte, N. C.—The Greensboro Poultry Frozen Food Co. has opened the new home of its branch here. Representing an investment of approximately $80,000, the plant and its equipment is the latest type. The refrigerated rooms and storage room are built alongside the loading dock and a conveyor system carries merchandise from and into this part of the plant. Approximately 2,800 sq. ft. of refrigerated space is maintained.

Stanley, N. C.—A branch of the Mount Holly Ice and Fuel Co. has opened here with the same service and accommodations featured at the Mount Holly plant.

Ohio

Troy, Ohio—Construction of a $1,200,000 meat packing plant has begun here, it was announced by officials of Braun Bros. Packing Co. It is estimated that the new plant will house the latest equipment and will triple present production, enabling Braun to process over a million pounds of meat per week.



Cut Costs TWO WAYS

By Modernizing Your Refrigeration With This New Condenser System

● Power savings and water savings combine to make money for you when you replace an old fashioned refrigerant condensing method with a modern Niagara AEROPASS Condenser. Either saving quickly returns the cost of the installation; both together make an important reduction in your operating costs for refrigeration.

In this new method the refrigerant gas passes through two cooling coils. The first coil, air-cooled, removes the superheat and condenses oil vapor from the refrigerant; the second condenses the refrigerant by the evaporation of a water spray from its surface. The heat is transferred to the air; less than 10% of the water used in conventional condensers is consumed and you save the cost of the water and the cost of its piping, pumping and disposal.

In addition the Niagara Aeropass Condenser controls the head pressure of your compressors at the lowest point for good operation, reducing your power bills. It does this automatically the year 'round, giving full capacity for peak summer loads and providing the greatest power saving in cold weather.

Hundreds of experiences in all industries that use refrigeration demonstrate these benefits and prove that they give a lasting improvement in refrigeration plant operation.

Write for Niagara Bulletin No. 103 for further information

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INDUSTRIAL COOLING • HEATING • DRYING

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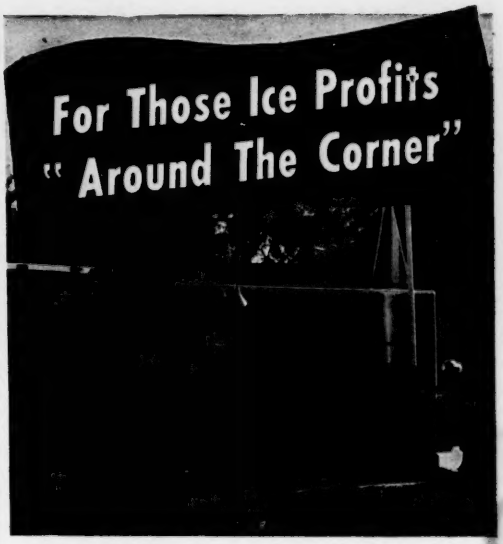


Fast-stepping City Ice Delivery Company of Wichita, Kansas, cashes in on a profitable new sales spot, above, by installing a day-and-night Sturdy-Built Automatic Ice Vending Station "just around the corner!"

Sturdy-Built

AUTOMATIC ICE VENDING STATIONS

City Ice Company, like other progressive ice distributors throughout the country, uses dependable, durable Sturdy-Built Stations to replace unprofitable routes... to cut cost corners . . . to hold old customers . . . to develop new money-making consumer outlets.

Completely Factory Assembled
No Hidden Costs or Headaches

Time-tested since 1930 . . . with *every* detail of construction entrusted only to refrigeration specialists . . . it's Sturdy-Built for trouble-free ice service 24 hours every day . . . for years and years of profit!

Write for details, specifications, new low prices

REFRIGERATED STURDY-BUILT ICE VENDING STATIONS

S&S ICE VENDING MACHINES

F. B. DICKINSON & CO.
Highland Park Station
Des Moines, Iowa

S & S VENDING MACHINE CO.
670 Lincoln Avenue
San Jose, California

Willard, Ohio—A 144 by 40 foot concrete addition is being constructed on the west side of the Wiers Bros. packing and storage plant in Celeryville. It will be used to make additional storage space for potatoes and onions.

Oklahoma

Guymon, Okla.—The Guymon Ice Plant here has installed two No. 14 Polar vendors.

Lindsay, Okla.—A No. 1410 Polar station with two vendors for cake and bag ice has been installed by Doyle and Taylor here.

Muskogee, Okla.—The Southern Ice Co. here has reinsulated its ice house. Woodrow Dickerson has been placed in charge as the new manager.

Pennsylvania

Ellwood, Pa.—Ellwood City Ice Co. has installed a two-belt model No. 14 Polar ice vending station.

Hereford, Pa.—A modern cold storage plant which will hold 20,000 bushels is being completed by Pennebacker Orchards here.

Philadelphia, Pa.—T. I. Carson recently purchased a No. 2214 Polar ice vending station.

Texas

El Paso, Tex. — The Wholesome Dairy, Inc. plant at 6982 Alemeda Ave. recently held its grand opening. The dairy company has a complete ice manufacturing plant which is one of the outstanding units. The new $250,000 plant is owned and operated by Lazar Kopilowitz. J. D. Cozby is manager.

Utah

Salt Lake City, Utah—A huge new cooling room is being constructed at the Utah Poultry and Farmers Cooperative poultry processing plant at 570 West Fourth South to take care of the increase in business created as a result of the "fresh fryer" program, according to George Rudd, manager of the poultry division.

Virginia

Lynchburg, Va.—Lynchburg Diamond Ice Co. is installing a commercial freezer in its plant at Orange and Adams Sts., according to John D. Doyle, president. A $28,000 permit for the improvement was recently issued by the city inspection bureau. The freezer will afford the first such service for wholesalers and distributing agents in the area.

Washington

Kent, Wash.—Vegetables and fruits from all over the Northwest are pouring into the recently completed Stokely Foods cold storage room here. Comprising a total of about 160,000 cubic feet, the local storage plant is one of the Northwest's biggest. A 315 by 55 foot section of the Kent Stokely plant was converted into a cold storage room. The room has capacity for storing 90,000 cases of frozen food.

Grandview, Wash.—Ralph Kenyon of the Zero Storage is building a $17,000 48x114 ft. building to be used for storing frozen food products. According to Dan Regan, plant manager, the firm now has capacity for 2500 tons of frozen food which is kept at a temperature of 12 below zero at all times.

Spokane, Wash.—The United Retail Merchants, Inc. is constructing a large warehouse at Ruby and Jackson which will house all facilities of the company. The 150,000 sq. foot building is expected to be completed in January, 1951. The cold storage rooms and pre-packaging equipment will be within the warehouse.

Thorp, Wash.—A new plant is being built near here, to be completed in time to freeze the crop from 600 acres of corn contracted in the Kittitas valley by the R. D. Bodle Co. of Seattle, according to Ray Willard, field manager.

Fires and Accidents

Alameda, Calif.—The storm-battered barge, William Taylor, was damaged when its ammonia tank blew up. It was tied at the Alaska Packers dock at the foot of Paru St. where the barge had been taken for repairs a week previous owing to damage from a storm it went through off the northern California coast, officials said. It is believed the blast was the result of leaks in the ammonia tanks that had been started by the heavy buffeting the barge underwent in the heavy seas. The barge is destined for use in a Peruvian port where it will be used as a floating cold storage plant.

Pueblo, Colo.—Flames swept the big Denver and Rio Grande Railroad's ice house here recently. It was expected that about 12,000 of the 18,000 tons of ice stored in the icehouse could be salvaged despite the effects of the fire. A short circuit in the wiring system was blamed. This building had replaced another icehouse, burned several years ago.

Holyoke, Mass.—The basement of the Glesman Ice Cream Co. at 77 Meadow St., in Springdale, was destroyed by fire running into thousands of dollars. The intense heat generated by the flames along with the escaping ammonia fumes from the downstairs freezing apparatus drove the firefighters out of the building several times.

Astoria, Ore.—Two-thirds of the Del Mar Canning company's modern fish processing plant on the Flavel waterfront was destroyed by a fire's damage estimated at approximately $500,000. Periodic explosions of chemicals, ammonia tanks' and butane gas tanks made the battle against the fire hazardous. Injuries to several firefighters occurred.

Austin, Tex.—The American Ice Service Company at 107 West Second St., here, suffered slight damage recently from a fire in the roof of its building. The fire started when sawdust at the bottom of an unused water tank on top of the roof caught fire from sparks thrown off by an exhaust pipe that led from a Diesel engine on the ground floor. Only damage caused was complete destruction of the water tank and burning of one corner of the roof next to the tank. Prompt action by city firemen prevented spread of the fire.

DEATHS

Albert J. Precourt

THE death of Albert J. Precourt, treasurer of the Manchester Coal & Ice Company, Manchester, N. H. occurred Monday afternoon, April 25 at a local hospital following a short illness. Mr. Precourt had been a resident of Manchester for more than 65 years.

He was president of the Manchester Water Board of which he had been member since 1923, former trustee of several state institutions, a former state representative and a former member of the old city council. He was parishioner of St. George church, a member of the Joliet Club, the Rotary club, the New Hampshire Pharmaceutical association, a director of the Amoskeag National Bank, the Amoskeag Trust Company, Amoskeag Industries and the New Hampshire Catholic charities. He was also a member of the Old Residents association, the Manchester Country Club, the Manchester lodge BPOE, a founder and member of the local YMCA, a member of the Manchester Institute of Arts and Sciences, a member of the Manchester Historical Society, and a member of the Newcomen Club.

Mrs. Hattie Mae Heartwell

MRS. Hattie Mae Heartwell, wife of Lionel F. Heartwell of Sarnia, Canada, who owned and operated the Sarnia Ice Co., died July 20. Mrs. Heartwell was actively associated in the ice business with her husband and was treasurer of the company. She was 65 years old. She was a member of the Central United church. A native of the United States, she had previously lived in Hamilton, Ont., and came with her husband to Sarnia six years ago when he purchased the ice plant.

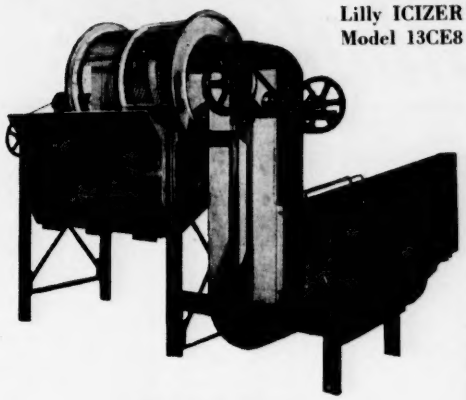
George A. Billingsley

THE death of George A. Billingsley, Memphis, Tenn., occurred August 9 at the age of 58. Mr. Billingsley was a member of a family closely associated with the growth and development of Memphis, and was formerly active in management of the old Bannon Coal & Ice Co., which was founded by his family and later operated by him and two brothers. He is survived by his widow, Mrs. Bernice Billingsley, and a daughter, Patricia Glory Billingsley.

ICIZERS—BREAKERS—BREAKER ELEVATORS—BREAKER FEEDERS—HANDLERS—UPENDERS—PLANT AND DELIVERY TOOLS AND SUPPLIES

ICIZERS
CRUSHERS
SCORERS
PAPER BAGS
ICE PICKS

Lilly ICIZER
Model 13CE8



THE LILLY COMPANY
466 Union Avenue, Memphis 1, Tenn.

ICE
Tools and Supplies

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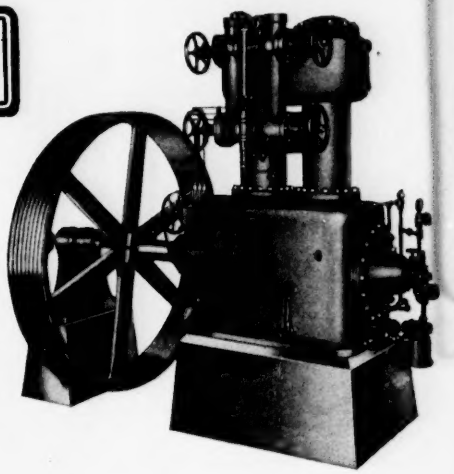
Cat. No. 101 Ice Tools & Supplies
Cat. No. 300 Ice Sizers & Crushers

Sterling DEPENDABLE REFRIGERATION



The phrase "STERLING DEPENDABLE REFRIGERATION" is more than a slogan—it's a fact.

Built with rugged strength for endurance, with advanced design for efficiency and economy of operation, STERLING Ammonia Compressors are the product of more than fifty years of "know how" in the manufacturing of refrigeration machinery and equipment.

A complete range of sizes insures the correct compressor for each application.

Deliveries are, at present, current—most models of compressors are available from stock.

For complete information, see your nearest STERLING distributor, or write the factory.

REYNOLDS MANUFACTURING CO.

SPRINGFIELD *"Builders of Fine Refrigeration Equipment"* **MISSOURI**

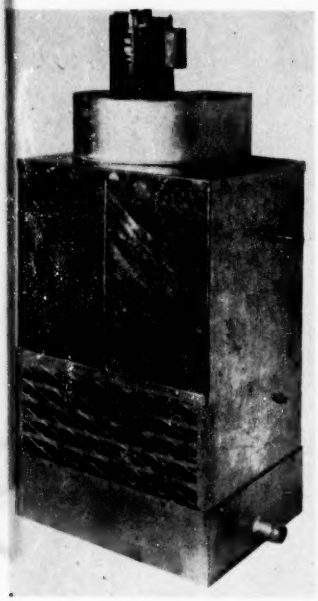
What's New

MACHINERY

APPLIANCES • PROCESSES

New Induced Draft Cooling Towers

A NEW series of induced draft cooling towers for use with self-contained refrigeration and air conditioning equipment, has been released by Acme Industries, Inc., Jackson, Mich. All unnecessary parts have been eliminated to reduce weight to the minimum consistent with long life. They may be used for indoor or outdoor application with external duct resistance of ¼ in. or less. These models are designated as Models TCJ-2, 2A, 3 and 3A.



New Acme induced draft cooling tower for small units

These are for use with units up to and including 5 hp. and are designed to save water and fill a need for low-cost cooling towers in this range. They are recommended for applications which require water conservation and the dissipation of heat from cooling water. Fans are located at the top to provide vertical air movement across the filling. Air is discharged horizontally at a velocity sufficient to prevent recirculation. The air intake and louver assembly is fabricated into a single assembly and designed to eliminate splashing.

The cooling tower base is of one piece construction 14 gauge pickled and oiled steel hot-dip galvanized after fabrication. The top and center section are each of one piece construction 16 gauge Zincgrip metal. A fan motor is provided suitable for either indoor or outdoor use.

The present models are not furnished with pumps because so many of these towers are being applied to existing systems and the pumping heads vary considerably, requiring individual pump selection. However, connections are provided to permit the use of an attached pump. All bolts throughout the unit are heavy cadmium plated and nuts are of the clip-on type specially treated to resist corrosion.

Cond-O-Therm Maintains Pre-Selected Temperatures

THE Cond-O-Therm system for maintaining predetermined temperatures in process lines provides a preformed, extruded companion line with substantial surface-area contact on the parent line. The area of heating or cooling surface obtainable is thus greater than the line contact heretofore relied upon and can be pre-calculated accurately. It is claimed that insulation is more economical and effective and that temperatures can be maintaind exactly at remote points, using steam, hot water, brine, ammonia, Freon or any other heating or cooling medium required.

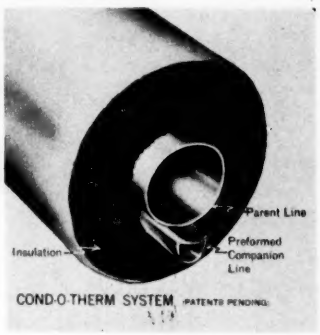


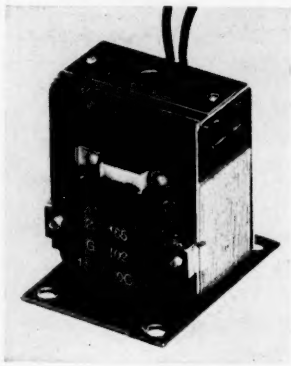
Photo-diagram of Cond-O-Therm system

The system is designed for maintaining any pre-selected temperature in lines carrying ice cream, chemicals, paraffin, fruit juices, milk, beer, etc., etc. It can be made from tubing of copper, monel, stainless steel or any metal required for the process. They can be furnished in multiples so that the parent line can, if necessary, be entirely clustered to maintain extremely high or low temperatures.

The parent line can be welded, sweated or flanged construction. One end of each length of companion line has a special extruded neck to provide a slip fit over the end of the next length, making it possible to silver solder or braze the joints in assembly. Complete systems, including insulation, are fabricated to order. Complete details may be obtained from Cond-O-Therm, 18 Littleton Ave., Newark, N. J.

New Solenoid Announced

A NEW short-stroke solenoid for heavy-duty industrial applications featuring a cast-permafil coil assembly has been announced by General Electric's Control Divisions. The basic component of the new device is a paper-layer-wound coil, a type that holds the voltage between turns to a minimum and greatly reduces the possibility of failure due



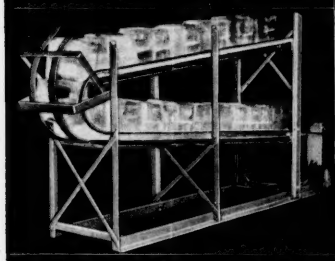
New short-stroke solenoid

to reduced voltage between layers of turns, they said. Foot-long Flamenol (Reg. Trade-Mark) leads are firmly anchored and taped, and the coil is placed in a mold into which liquid permafil is poured. After the permafil hardens, the coil assembly is baked. This results in a solid protective block around the coil that is moisture-, oil-, shock-, and vibration-resistant. It is available in four models, including strokes of ⅛ in. and 5/16 in. and two stacking thicknesses.

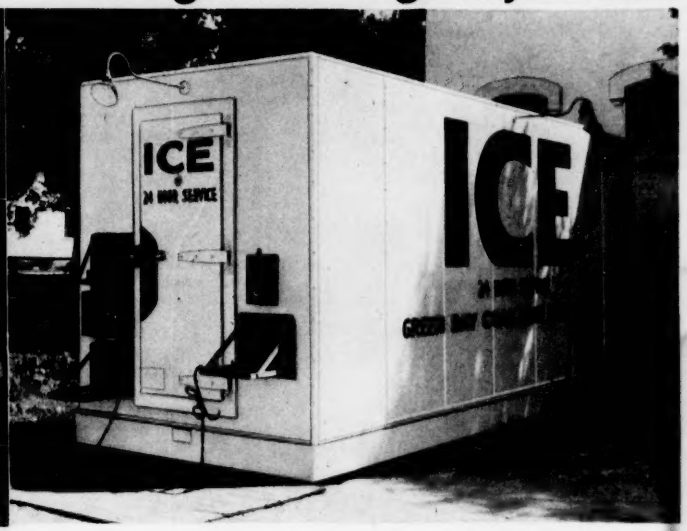
A FRIGID-VEND Ice Station has the Rugged Construction of a Refrigerated Highway Trailer

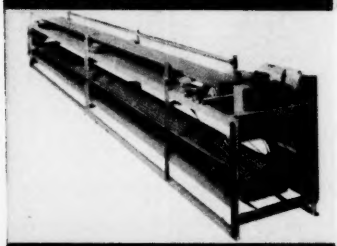
4 TYPES OF VENDORS

Will fit any Frigid-Vend Ice Station. Can also be purchased separately for installation in any ice storage room. Equipped with foolproof mechanism and coin box. PRICES START AT **$495.00**

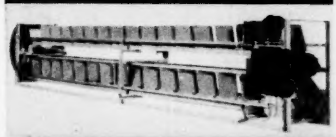


GRAVITY VENDOR for vending ice blocks direct from cold room. Capacity up to 54 units.

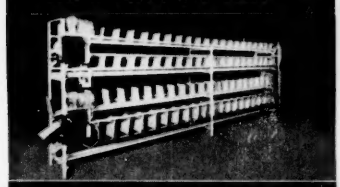




METAL BELT BAG VENDOR double-deck. For 7½ lb., 10 lb. and 12½ lb. bags. Capacity up to 62 units.



CHAIN DRIVEN BAG VENDOR double-deck for bags or cartons of crushed or cubed ice. Capacity up to 42 units.



CHAIN DRIVEN COMBINATION BAG AND BLOCK VENDOR four-deck. Capacity up to 76 units.

A FRIGID-VEND Ice Station lasts longer because it is more sturdily built. The same construction, which year after year keeps a swaying refrigerated trailer "cold-tight" on a bumpy highway, is used in these ice stations. Exterior is of 24 gauge rust-resistant Galvannealed steel panels mounted directly on a steel structure, (not wood) thus preventing warping. Walls, roof and floor are insulated with 6" of Rock Wool, consisting of two 3" layers of Rock Wool batting with waterproof paper on both sides of each batt. Interior is waterproof plywood. Furnished in four sizes complete with refrigeration, light fixtures and wiring—ready for operation.

WRITE FOR COMPLETE DETAILS

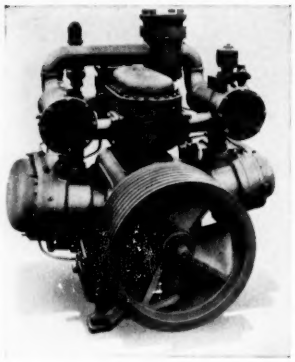
THERMO CUBER

THERMO CUBER CO., INC.

2120 No. Southport Ave. • Chicago 14, Ill.

Frick Announces New 9-Cylinder Compressor

THE addition of a 9-cylinder refrigeration machine to its line of new "Eclipse" compressors is announced by Frick Co., Waynesboro, Pa. These compressors are now furnished in five sizes, having 2, 3, 4, 6 or 9 cylinders. The largest machine has a nominal capacity on air conditioning work of 90 tons of refrigeration. All sizes have a cylinder bore of 4⅜ in. and stroke of 4¼ in. The smaller machines have capacities in proportion to the number of cylinders. Operating speeds on all sizes are between 725 and 900 rpm. Freon is the refrigerant used throughout the series.



A view of the wheel end of the compressor shows suction manifold arrangement and the dual scale traps and the capacity control mounted above. The connections to the three banks of cylinders can be seen.

The 9-cylinder machine has three banks of cylinders, placed as illustrated. The angle between the vertical cylinders in the center and the banks at the sides is arranged to give an even torque on the shaft. The banks are staggered to permit the connecting rods from three cylinders to engage one crank on the shaft. Operation is extremely smooth.

The crankcase is made unusually rigid and has a large oil reservoir in its base. Plenty of lubrication is thus made certain, though the cranks do not dip in the oil. Grouped on the solid end of the crankcase, opposite the belt wheel, is the force-feed oiling equipment, including the pump, regulating valve, pressure gauge, suction screen, filling valve and bullseye. Oil and gas equalizing connections are provided for operating two or more compressors in parallel. The oil returning with the suction gas is drained back to the crankcase from each bank of cylinders through a special device which also equalizes the pressures without sudden changes.

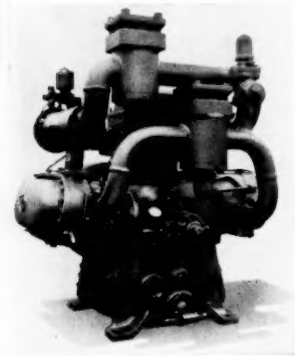
All the cylinder heads and pistons can be removed without disturbing the pipe connections, motor, or V-belt drive. By ingenious design, manifolds and cylinders are separate and exposed to ambient temperatures. This reduces to a minimum the passage of heat from discharge gas to suction gas and permits operation with minimum superheat losses.

The main suction stop valve, of 4-in. iron pipe size, connects with two scale traps, one on each side of compressor, which provide ample distribution to each bank of cylinders. Above the traps are mounted the capacity controls, when required. These controls are actuated by discharge pressure, and are arranged to hold open the suction valves of one or two cylinders in a bank. A water-jacketed plate is used to keep the valves cool when capacity control is used. The water first goes through the patented Frick Flexo-Seal at the shaft.

The main discharge stop valve is of 3½-in. size. Welded and O.D. tube connections are available when wanted. Both of the main stop valves have seal-caps.

The crankshaft is dynamically balanced, for smooth running, with four sets of counter-weights. The belt wheel, which is similarly balanced, is fitted to the shaft on a taper, and is easily removed for inspection of the Seal. Fan blades replace the spokes of the wheel, to provide extra ventilation. Flexible couplings are available for direct-connecting a pair of compressors to a motor mounted between them. When V-belt drive is used with motors operating at 1750 rpm, ball or roller bearings are recommended for the motor.

The bearings of the compressor are precision-made, and are the type now widely used in Diesel and airplane engines, for long wear. The length and breadth of the 9-cylinder compressor are both 3 ft. 5½ in; the height, over the flange on the main suction valve is 3 ft. 8¼ in.



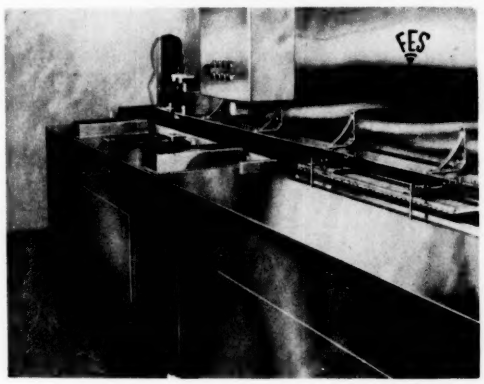
The suction stop valve and manifold are above with the discharge connections below. This end also contains the force feed lubricating system.

Automatic Continuous Quick Freezer Installed

MANUFACTURE of a large size automatic continuous quick freezer for packaged frozen foods has been completed by Freezing Equipment Sales, Inc., of York, Pa., and is now being installed in the plant of Fairmount Canning Co., at Winnebago, Minn. This new unit is designed to freeze 6750 lbs. of packaged foods per hour and will handle three package sizes, the 40 oz. institutional package, the standard retail package, and a special corn package without any change in delivery methods.

This freezing machine, which was developed early this year, automatically handles the packaged frozen food from the packaging machine through the freezing process. The only thing that ever enters or leaves the freezing room is the package of frozen food itself.

The packages are carried from the delivery table of the machine into the freezing shelf which automatically moves up into the freezer room as additional packages are sent in. The frozen packages are ejected by the pusher ram when new charge is inserted into the shelf. The freezer room holds 28,224 packages at one time in a space 38 ft. long, 9 ft. high and 8 ft. wide.



Front view of automatic continuous quick freezer for packaged frozen foods made by Freezing Equipment Sales Inc., for installation in Fairmount Canning Co. plant at Winnebago, Minn. This machine includes positive package placement through an ejector ram which has electronic control for safety.

Tops in Value

Here is America's top value in a Well Water System—value that comes from years and years of careful study, much experiment and the final solving of just what metals are best for each part of the pumping equipment. This is the Water System that has made good in all parts of the world and under all kinds of conditions. This is the kind of a system that will give you the utmost satisfaction. Write for catalogs.

LAYNE & BOWLER, Inc.
General Offices, Memphis 8, Tenn.

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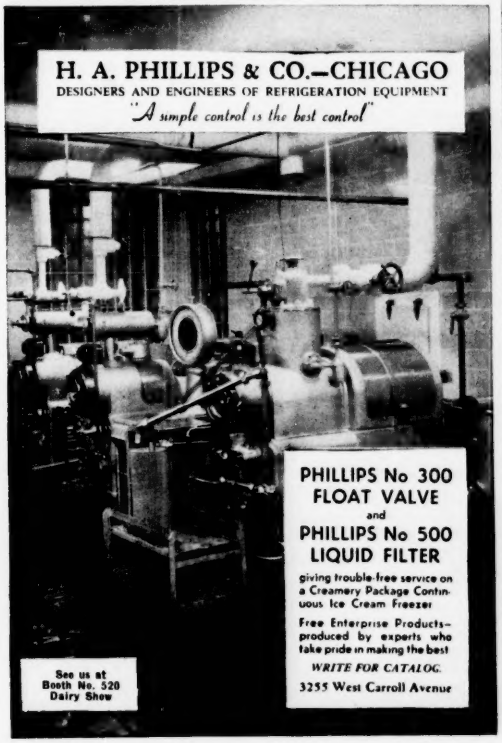
WELL WATER SYSTEMS

VERTICAL TURBINE PUMPS

H. A. PHILLIPS & CO.—CHICAGO
DESIGNERS AND ENGINEERS OF REFRIGERATION EQUIPMENT
"A simple control is the best control"



PHILLIPS No 300 FLOAT VALVE
and
PHILLIPS No 500 LIQUID FILTER
giving trouble-free service on a Creamery Package Continuous Ice Cream Freezer

Free Enterprise Products—produced by experts who take pride in making the best

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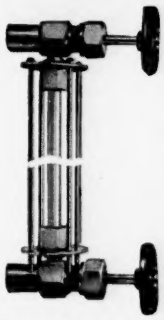
3255 West Carroll Avenue

See us at Booth No. 520 Dairy Show

SHANK
REFRIGERATION PRODUCTS

Provide maximum service under toughest operating conditions.



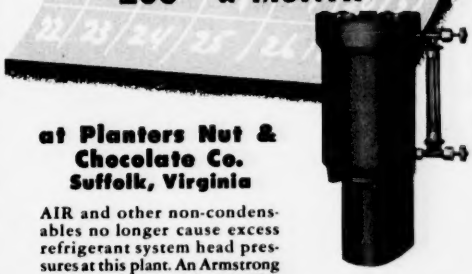
ALL-STEEL GAUGE SETS
All-Steel Construction. Automatic shut-off of liquid in case of glass breakage. Composition packing rings give long life, no-leak seal.

ALL-STEEL LINE VALVE
Compact—Machined from bar stock steel—Full size ports — Completely rust-proofed — Highest grade graphited composition packing. All popular sizes.

See your jobber—or write us for prices.

CYRUS SHANK CO.
629 W. Jackson Blvd. Chicago 6, Ill.

ARMSTRONG PURGER CUTS REFRIGERATING POWER COSTS $250.00 a MONTH



at Planters Nut & Chocolate Co.
Suffolk, Virginia

AIR and other non-condensables no longer cause excess refrigerant system head pressures at this plant. An Armstrong Purger has lowered it 20 lbs. with power savings estimated at $250 per month. Other benefits: 5% increase in compressor capacity, savings in refrigerant, water, and work.

Check your system for excess head pressures. If it's high you have a real opportunity for savings with the Armstrong Purger. Bulletin 192 gives details. Write:

ARMSTRONG MACHINE WORKS
860 Maple St., Three Rivers, Mich.

ARMSTRONG Forged Steel PURGER

Unit Racks Provide Flexible Storage System

A FURTHER development of the popular storage rack system has come to be the unit idea, whereby rack units can be moved and set up where and when needed. By this system floor space available becomes flexible as the same storage racks can do duty wherever needed as well as in a fixed position.

Sample storage racks installed

This is accomplished by the use of arc welded rack sections designed for rapid assembly by means of sliding joints. No bolts are used, hence no tools are required in assembly. The sections are self-nesting. These racks can be made for various sizes of pallets and to suit various heights and weights of loads.

A sample of such racks are shown in the photo above. They are Loadmaster storage racks (Type D) made by Lewis-Shepard Products Inc., 260 Walnut Street, Watertown, Mass., makers of the Master Line of materials handling equipment. Other styles of storage racks are also available.

Pipe Couplings

MORRIS pipe couplings are now available for pipe sizes up to 8 inches, according to an announcement made by Morris Coupling & Clamp Co., 1410 Beaver Avenue, Ellwood

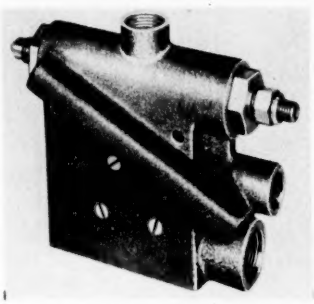
Morris pipe coupling

City, Pa. The new range of sizes is made possible by an expanded tooling program. The company also announces that, in addition to the standard zinc coated steel line, all aluminum couplings are available in all sizes to 8 inches.

Morris pipe couplings are used for permanently joining either plain end or threaded pipe or a combination of the two. The pipe coupling is the only compression band type coupling on the market and serves to hold the entire surface of the joint in compression. The coupling is easy to apply with a socket or crescent wrench and gives each joint the advantage of a pipe union. These couplings are now being used successfully on oil, gas, water, steam, air, sewage, irrigation, and conduit lines. Rubber base gaskets are furnished as standard equipment, but gaskets of various types such as cork, fibre glass, and neoprene are also available. Descriptive literature will be mailed upon request.

New Hydraulic-Pressure Electric Switch

A NEW, cartridge-type hydraulic pressure electric switch has been announced by Pantex Manufacturing Corporation. Designed for the precise control of electric circuits by means of hydraulic-pressure actuation, this Pantex hydraulic pressure electric switch will cut-in and cut-out electric circuits with as little as 12 to 18 percent pressure differential. Unaffected by extreme pressure surges, temporary or sustained, the unit has also withstood a wide temperature differential ranging from -65 F to 160 F without loss of accuracy or other desirable operational characteristics.



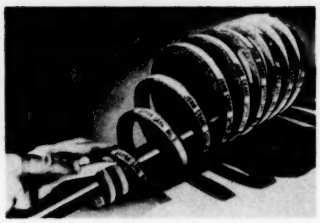
New Pantex hydraulic pressure electric switch

Manufactured within precision tolerances, the design of this unit eliminates failure due to either mechanical or hydraulic shock. It operates immediately with every start of the pump and requires no pressure build-up. Small, light-weight, and silent, it is quickly and easily adjusted without breaking the line with the added feature of pre-set switch limitations if desired.

Complete details may be obtained by writing direct to Hydraulics Division, Pantex Manufacturing Corp., Box 660, Pawtucket, R. I.

Plastic Packing With "Tape Back"

A SECURELY vulcanized tape-back is now offered as an integral part of all "Super Seal" spiral packings made by Crane Packing Co., 1800 Cuyler, Chicago, Ill. This development increases packing flexibility and, for the first time, brings a plastic packing into the easy-to-handle class of ordinary braided fabric styles. Ring cutting is greatly simplified with this type of reinforcement because the spiral can be twisted down to small shaft sizes, and then cut into rings without breakage.



Super-Seal plastic packing with tape back

A primary advantage of this flexibility is the significant savings enjoyed by users of the packing. Elimination of the normal breakage which occurs in twisting-down means that none of the packing need be thrown out because of handling damage. The problem of packing style identification has also been solved with the addition of this tape-back construction. Each Super Seal style is clearly marked in a different color for ready identification. This line of packings is furnished in six different styles to cover the range of operating conditions met throughout industry. A special booklet offered by the manufacturer describes the entire line and includes service recommendations.

New Ice Flake Machine Announced

LIQUID FREEZE CORPORATION, Oakland, Calif., recently announced its Instant Ice Machine, and is going ahead with a nation-wide distribution program. This new machine is designed to produce up to a ton of ice flakes a day. By simple addition of a thermostat control, it can be made completely automatic to produce ice only as it is needed. Lesser quantities of ice may be produced as requirements demand without affecting the basic cost per ton, according to the manufacturer.

The machine employs a principle of operation described by the manufacturer as "Fracturmatic." A principle borrowed from nature, the freezing cycle takes advantage of the natural tendency of liquid to expand as it freezes. Here's how it works: Specially designed removing blades

DIMCO CAST ALUMINUM FIN EVAPORATING COIL

★ *Saves Space*

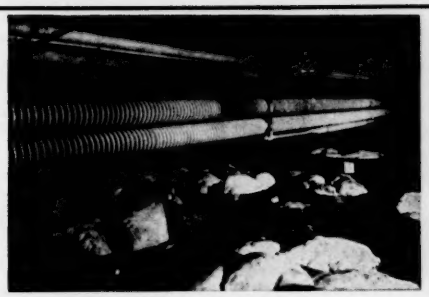
★ *Saves Weight*

★ *Saves Cost*

CAN BE USED WITH ANY REFRIGERANT
SALES AGENCIES SOLICITED

Manufactured by

DETROIT ICE MACHINE COMPANY
2615 Twelfth St., Detroit 16, Mich.



Pickled Meat Cellar
Mathew H. Klein Co., Detroit, Mich.

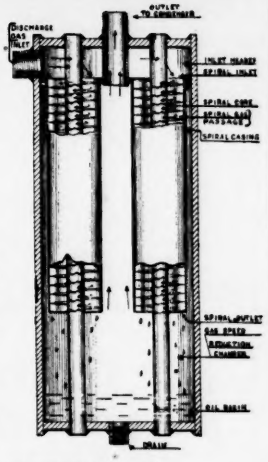
"King Zeero"

OIL SEPARATOR

STOPS OIL FROM ENTERING CONDENSER RECEIVER AND LOW SIDE

Allows operation as was originally intended. Simple in operation — no parts to wear out — no screens, metal wool or any close screens to clog, raise discharge pressures and cut down capacity.

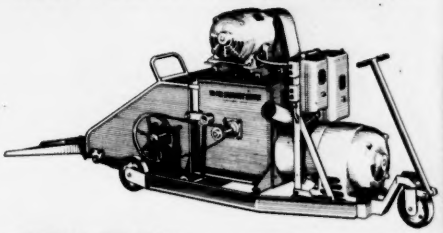
When used in connection with air compressors, water is also separated with the oil.



Built for years of trouble free service.
Mechanical details on request.

THE KING ZEERO COMPANY
1447-55 Montrose Ave., Chicago 13, Ill.

CRUSHES and DELIVERS 1800 lbs. of ICE per MINUTE



TRI-PAK ICE CRUSHER-SLINGER
(ELECTRIC OR GASOLINE POWERED)

You can ice a load in a matter of minutes with the Tri-Pak Crusher-Slinger because it's the one machine that has the *instant capacity* to produce as much crushed ice as you need, *as fast as you need it!*

With welded steel construction and heavy "X" type frame, the Tri-Pak Crusher-Slinger is *built to take it*, year after year. This portable unit has rubber-tired, ballbearing suspension, making it easy to move. The flexible slinger outlet can be rotated and locked in any position for delivery of crushed ice through rubber or metal hose attachments.

Tri-Pak individual ice crushers, ice elevators, ice conveyors, and icing chutes, slide gates, trolley and assessories can be quickly built to your specifications. For complete information, phone or write today.

TRI-PAK Machinery SERVICE INC.
HARLINGEN, TEXAS

Phone 703

PITTSBURGH
a air p pressure t tested COILS

Welded Headers—Welded Ammonia Receivers—Accumulators
Pipe Coils—Bends—Boiler Tubes

Pittsburgh Pipe Coil & Bending Company
61 BRIDGE STREET ETNA, PITTSBURGH 25, PA

are mounted on a vertical steel bar attached to the revolving water distribution head and follow 25 degrees behind the revolving water curtain. Ice is super-cooled and dry before action by the blades. Blades fracture the ice sheet and remove the ice from the freezing surface of the evaporator drum by a lifting action. Research and tests are under way to adapt the machine for the freezing of liquids other than water. Among liquids being tested are milk, certain fruit juices and raw eggs.

The machine is encased in a four-piece all steel, rust-resistant cabinet. The back is covered by an expanded metal screen for air circulation and is easily removable for inspection. The unit is completely self-contained and simply designed for ease of installation. The entire unit measures only 24x26x69 in. and requires a minimum of floor space.

Packless Reducing Valve

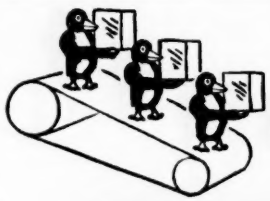
A NEW packless reducing valve has been engineered by The C. E. Squires Co., Cleveland, Ohio, in both pilot operated and direct operated valves in sizes up to 3 inches. This new feature has been added without any changes being made in the external dimensions of the valve, is completely frictionless, eliminates sticking stems, giving added control to valves already holding within one ounce on reduced pressure.

MANUFACTURERS' NEWS

Creamery Package Board of Directors Meet at CP Factory

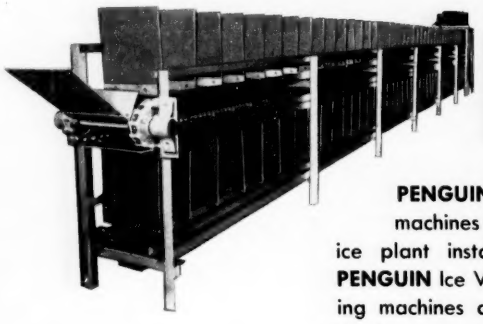
CP Board of Directors Meet. Left to right: G. W. Putnam, A. W. Craven Jr., H. A. Dreffein, A. W. Craven, Sr., G. E. Wallis, C. S. Hook, E. W. Pratt, D. W. Fisher, and E. B. Lehrack.

PICTURED above are the directors of The Creamery Package Mfg. Company who held their recent meeting at the CP Fort Atkinson factory. Following their meeting the directors made a tour of the CP plant facilities at Fort Atkinson and Lake Mills, Wisconsin. According to G. E. Wallis, CP president and general manager, the meeting was held at the Fort At-

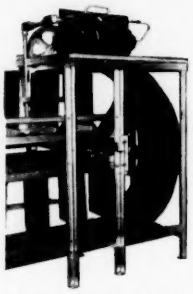


Penguin ICE SERVICE

Positive 24-hour service with... PENGUIN PADDLES



PENGUIN PADDLES PAY MORE PROFIT



Rear view of 2-deck machine showing motor controls, etc.

PENGUIN aluminum ice vending machines are sold separately for ice plant installation or installed in **PENGUIN** Ice Vending Stations. Vending machines are constructed to vend the ice your customer wants . . . when he wants it . . . NOW!

POSITIVE DELIVERY of ice identifies the PENGUIN Vending machine with the PADDLES

TOWAL MANUFACTURING CO.

MARION ILLINOIS, U. S. A.

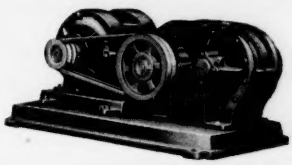
MODEL C-2
Approved by Underwriters' Laboratories, Inc.

CONTROL ODORS AND MOLD

GENERAL OZONE *Air Clear* EQUIPMENT OFFERS ADEQUATE PROTECTION FROM MOLD AND ODORS

For nearly fifty years ozone has been used in cold storage plants to reduce odor and mold conditions.
Investigation by competent authorities have shown that no other device or method is superior to ozone for the control of these conditions.
General Ozone has a complete line of modern ozonizing equipment plus full repair service facilities for both old and new types. Write for further information.

GENERAL OZONE CORPORATION
1455 West Congress St., Chicago 7, Illinois
Manufacturers of ozone generating equipment for cold storage ● warehouses refrigerated cars ● walk-in coolers ● air recirculating systems.



To Meet Seasonal Demand Changes

...Install R-C BLOWERS

To meet production variations created by seasonal demand changes . . . install R-C Blowers. They deliver a dependable, constant volume of air throughout their rated capacity range, regardless of rapid variations in operating conditions or temperatures.

Moderate speeds and sturdy construction assure years of top performance and virtually maintenance-free operation. Tell us your requirements for replacements or additions, or ask for Bulletin R-C 1247.

ROOTS-CONNERSVILLE BLOWER Corp.
909 Columbia Avenue Connersville, Indiana

ROOTS-CONNERSVILLE
ONE OF THE DRESSER INDUSTRIES

Is Space an Important Factor?

Then Use This Distinguished Line of Close-Coupled Pumps

These GMC Pumps are ideal for a multitude of jobs. Smooth and efficient whether vertical, horizontal, up-side-down or any inclination. Low first cost, low power and maintenance costs. Top quality "by Aurora."

Caps. 10 to 800 G.P.M.
Heads to 250 Ft.

PUMPS *by* Aurora

Type GMC Aurora Close-Coupled Pump

Write TODAY for CONDENSED CATALOG "M"

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AURORA Always PUMPS — AURORA PUMP COMPANY

NOZZLES • DROP TUBES • CAN DOGS • CAN FILLERS • BLOWERS • BRACKETS • BAGS • HOISTS • ICE CRUSHERS • RUBBER TUBING •

WHEN YOU PLACE AN ORDER WITH US, LARGE OR SMALL, YOU RECEIVE PROMPT SERVICE, COURTEOUS TREATMENT AND THE BEST MERCHANDISE YOUR MONEY CAN BUY.

WHY NOT TRY US? SEND FOR CATALOG—
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ICE PLANT EQUIPMENT CO., Inc.
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TUBE CLEANERS • PUMPS • FILTERS • VALVES • ICE TONGS • THERMOMETERS • ICE PICKS

kinson factory so that the directors could review at first hand the company's latest production methods, and also acquaint representative factory employees with management.

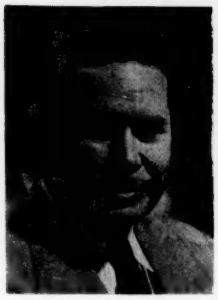
Baker Appointments

IT HAS been announced by Harvey Gaylord, acting president of Baker Refrigeration Corp., South Windham, Maine that effective August 1 Frederick W. Smith, for the past six months vice-president in charge of sales, has been named executive vice-president of the Baker Corporation. Simultaneously, the appointment of Mark E. Mooney as sales manager of Baker was announced. Mr. Mooney resigned his position with the Carrier Corporation and joined Baker on August 1. His association with Carrier dates back to 1936 when he headed commercial refrigeration sales for the Carrier Company in the Chicago District.

Prior to the war, he was transferred to Carrier's main office in Syracuse as commercial sales manager. In this capacity, he handled the bulk of the company's government contracts. Immediately after the war, he was appointed Carrier's products manager of commercial refrigeration. Before joining Carrier, he was connected with General Electric in the Rex Cole distributing organization at New York.

Christner Advanced By Eagle-Picher

THE appointment of Glen J. Christner as general manager of the Eagle-Picher Sales Company's insulation operations has been announced by Clyde B. Lynde, vice-president. A native of Horton, Kansas, Mr. Christner is a graduate engineer of the Missouri School of Mines, Rolla. After receiving his mechanical engineering degree, he became a sales engineer with Ingersoll-Rand. In 1932 he joined Eagle-Picher as New York district manager of the insulation division. For the past year, he has been national sales manager of the Eagle-Picher storm window department.



Glen J. Christner

His new headquarters will be in the company's general offices in Cincinnati.

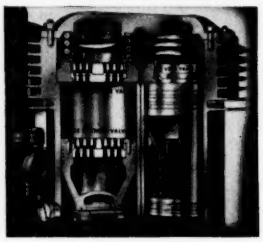
Nelson A. Blair

Concurrently with the announcement of Mr. Christner's appointment, Mr. Lynde also announced the promotion of Nelson A. Blair to national sales manager of Eagle-Picher's storm window department, succeeding Mr. Christner.

Mr. Blair received his education at the University of Cincinnati. He joined the ARMCO organization and then came to Eagle-Picher in 1932 with the advertising department before becoming sales manager of home insulation. He then became assistant to the general manager of insulation.

NO OTHER COMPRESSOR VALVE OFFERS YOU ALL OF THESE ADVANTAGES

- Lower power costs.
- Increased capacity.
- Elimination of enforced shutdowns due to faulty compressor valves.
- Safe and quiet operation of your compressor.
- Increased net profits.



VOSS VALVES are indispensable for use where loads are heaviest — where safety and reliability are paramount. They run smoothly — with less power — at higher speeds — without overheating. You can replace your present valves with VOSS VALVES without any change in your compressor.

For Better Performance

VOSS LONG LIFE COMPRESSOR VALVES

We will be glad to submit estimates, if you will send us the name, bore, stroke and speed of your air, gas, or ammonia compressors of any type or size.

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MARTOCELLO AIR SYSTEMS AND SUPPLIES

same high quality
same fair prices

with *NEW* management

...and a brand *NEW* POLICY

!

JOS. A. MARTOCELLO & CO.
PHILADELPHIA 7, PA.

Millsom Joins Acme Industries

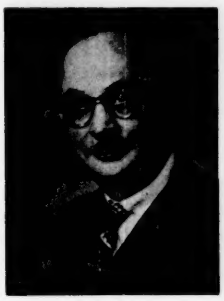
THE management of Acme Industries, Inc., Jackson, Mich., has announced that Carl Millsom has joined Acme as manager of the Flow-Cold division and will direct the sales on the Flow-Cold Liquid Chiller and the Model TCJ cooling towers. Mr. Millsom operated the Temperature Equipment Corporation, distributors for Chrysler Airtemp Air Conditioning packaged units, heating as well as commercial and industrial refrigeration equipment. He has also been associated with the Fedders-Quigan Corporation selling room air conditioners, unit coolers and air cooled refrigeration condensers.

Carl Millsom

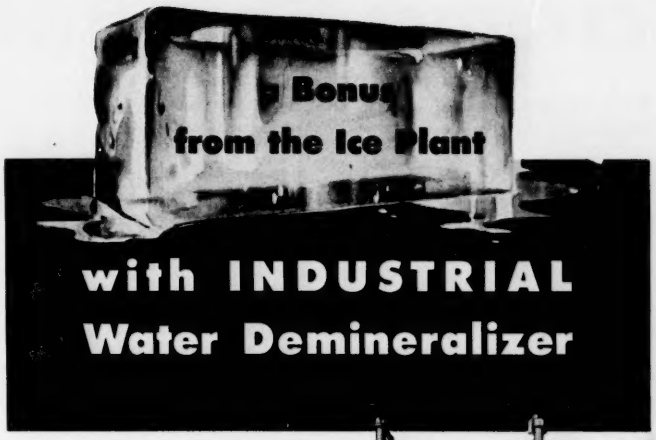
While with Chrysler Airtemp he was district engineer, district manager, and regional manager.

Stencel Advanced by Canadian Ice Machine

THE appointment of R. A. Stencel to the position of vice-president of Canadian Ice Machine Co. Ltd. has been announced by H. V. Shipley, president. Mr. Stencel has been with the company for thirty-seven years and as chief engineer is well known throughout refrigeration circles. He is Canadian representative on the Board of the American Society of Refrigeration Engineers and is a director of the Canadian Refrigeration Manufacturers Association.



R. A. Stencel



A typical two-bed Industrial Water Demineralizer. Standard models available with capacities up to 1000 gph. Special units of any capacity engineered to requirements.

Here's how it works...

Instead of running ordinary city water into the freezing tanks, it is passed through the Industrial demineralizer where beds of ion-exchange resins remove the dissolved mineral salts—delivering the chemical equivalent of pure water.

With this pure water there are no minerals to deposit in the core—so the whole core-pulling operation is eliminated. Furthermore, the amount of ice which cracks in the cans is appreciably reduced. And the transparency of the whole cake is improved—your customers will notice the difference and like it.

It's easy to find out how to get this big bonus from your ice plant. Send us an analysis of the water you are using, the quantity you need, and at what rate (gallons per hour). We will send you complete information on demineralized water, estimate of costs, performance data, etc. Better look into it right away.

FILTERS Pressure Type PUMPS Centrifugal CORROSION TESTING APPARATUS Salt Fog • Humidity

INDUSTRIAL FILTER & PUMP MFG. CO.

5914 Ogden Avenue
Chicago 50, Illinois

RUBBER DIVISION Vulcanized Linings • Molded Products WATER DEMINERALIZERS

CATALOGS AND BULLETINS

Booklet Gives Ideas On Pumping Problems

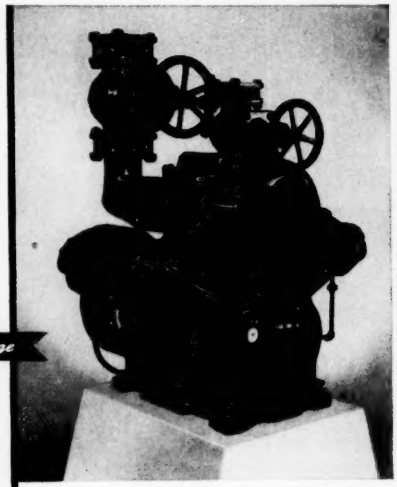
A NEW 16 page bulletin issued by Layne & Bowler, Inc., Memphis, Tenn., has some ideas on solving pumping problems, titled "Layne Short Coupled Service Pumps." It contains cut-away drawings of pump bowls and discharge column. Sixteen sketches show the Layne Vertical Turbine Pump applied to various applications.

Bulletins on Hand Lift Trucks

GIVING specifications, dimensions, capacities and outstanding mechanical details, two new bulletins on hand lift trucks are offered by Lift Trucks, Inc., Cincinnati. The bulletin on "Red Arrow" single stroke mechanical lift trucks covers six models. Capacities range from 2500 to 5000 lbs. These trucks are designed in a standard size to fit all skids having 6½, 7½, 9½ and 11½ in. clearance with many widths and lengths. The folder on "Hydromatic" fluid ram lift trucks also covers six models with capacities up to 8000 lbs. and the same skid specifications. For a copy write Lift Trucks, Inc., 2425 Spring Grove Ave., Cincinnati 14, Ohio.

Whatever You Need in Refrigeration

Creamery Package



CP either makes or can provide you with leading makes of

Shell and Tube Condensers

•

Evaporator Condensers

•

Ammonia Fittings

•

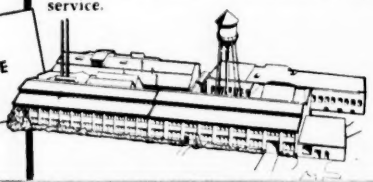
Ammonia Controls

•

CP offers you an extensive line of vertical two-cylinder Compressors, Self-contained Marine Units and Multi-cylinder Compressors and Boosters plus CP Engineering to cooperate in planning efficient economical refrigeration systems.

The modern CP factory (pictured below), which is devoted exclusively to the manufacture of refrigeration machinery, combines with a coast to coast network of 21 company owned and operated branches to give owners of CP Refrigeration Equipment the important advantage of one source of *complete* supply and service.

The Home of CREAMERY PACKAGE REFRIGERATION



THE Creamery Package MFG. COMPANY

General and Export Offices: 1243 W. Washington Blvd., Chicago 7, Illinois

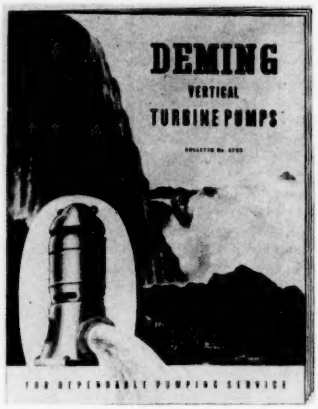
Atlanta • Boston • Buffalo • Chicago • Dallas • Denver • Houston • Kansas City, Mo. • Los Angeles • Minneapolis • Nashville • New York • Omaha • Philadelphia • Portland, Ore. • St. Louis • Salt Lake City • San Francisco • Seattle • Toledo, Ohio • Waterloo, Ia.

CREAMERY PACKAGE MFG. CO. OF CANADA, LTD. 267 King St., West, Toronto 2, Ontario

THE CREAMERY PACKAGE MFG. COMPANY, LTD. Avery House, Clerkenwell Green, London, England

New Bulletin Describes Deep Well Turbine Pumps

A NEW bulletin, No. 4700, has been issued by the Deming Company, Salem, Ohio, describing the concern's line of deep well turbine pumps. The 20-page booklet has large illustrations showing construction details, various typs of drive and typical installations. Graphic portrayal of details is obtained by the use of color printing in construction views.



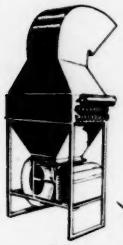
Although widely used for pumping water supply from deep wells for all types of industries, these pumps are used successfully in irrigation systems, air conditioning systems (where well water is used as the cooling agent), mine dewatering, and in sump pumping service. Other services include loading tank cars, and other types of pumping operations.

Pumps are furnished for wells with inside diameter of four inches or larger. Capacities vary from 12 to 3000 gallons per minute.

Revised Literature on Corrosion Test Cabinets

A REVISED catalog page has been issued by Industrial Filter & Pump Manufacturing Company, 5900 Ogden Avenue, Chicago 50, Ill., on their test cabinets that are used for accelerated testing of the corrosion-resisting qualities of coatings on metal products. These cabinets are used extensively by manufacturers and users of paints, lacquers, and in electroplating plants. This new literature gives detailed description of applications, design features, and the principal specifications of the different size models.

BETTER FREEZING—
LOWER STORAGE ROOM TEMPERATURE



REX
Super-Heat Extractor

ARMSTRONG CREAMERY COMPANY

July 22-1949.

Mr. R. E. Walters,
Rex Engineering & Sales Co.,
Oklahoma City, Okla.

Dear Mr. Walters:

The Oil Extractor and Super Heat Extractor as installed are doing very nicely, last year we were operating at extra high temperatures, at times this pressure would cut off the safety and relay.

This year our head pressure has never been over 175 pounds, therefore having better freezing and lower storage room temperatures.

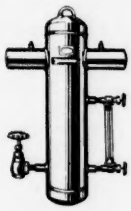
We find that the Heat Extractor will bring our ammonia discharge gas temperatures down to within ten points of the outside air temperatures, thus taking quite a load off our condensers.

This is one piece of equipment which has saved us a lot of money in power bills, and we figure will more than pay for itself with the savings in this season operation.

Yours very truly,

ARMSTRONG CREAMERY COMPANY

Oklahoma.



REX
Oil Extractor

You can effect the same savings made by Armstrong Creamery Co. and many others, by installing Rex Equipment. Write today for full details.

REX ENGINEERING & SALES CO.
Dept. IR Oklahoma City, Oklahoma
BOX 9141

INCREASE YOUR PROFIT
WITH IMPROVED AUTOMATIC
LOADER SHAKER SIZER

This new Bateman unit, incorporating revolutionary design that eliminates vibration on frame of shaker, assures added years of service and economy. One man can keep unit in operation, bagging and loading magazine.

Three sizer screens, running on roller bearing in counter-balancing action, operate without vibration. Screen openings, 1½", ¾" and ⅜". Shaker motor ½ H.P. Processes 175 lbs. of ice per minute.

Slow revolving drum, 12 large teeth, hold snow to absolute minimum. Removable plate on side of crusher so teeth can be changed easily and quickly. Five grate adjustments to help size ice before it reaches sizing screen.

LOW PRICE: Complete with motors, switches and galvanizing. F.O.B. Mineral Wells, Texas **$1,424.50**

WRITE TODAY FOR FULL INFORMATION

Bateman
Ice Processing Equipment
MINERAL WELLS, TEXAS

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ICE DEALERS SUPPLIES

Only the Highest Quality Merchandise and efficient service necessary for the proper and profitable operation of your business. Write for our 1950 catalog.

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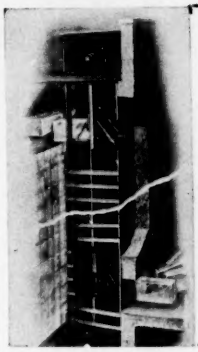
LA PORTE, INDIANA



CEMCO

Double Gig Ice Hoist
Fast - Sturdy -
Dependable -

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Consulting Engineers
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Ice Making and Refrigeration - Industrial Power Plants
Reports, Appraisals and Management

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TRADE MARK REG. U.S. PAT. OFF.
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ICE TOOLS
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WE CONTINUE YEAR AFTER YEAR
to make the kind of Ice Picks that will give YOUR customers satisfaction and build up GOOD WILL FOR YOU.

PRICE UPON REQUEST

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QUALITY COILS FOR ALL APPLICATIONS

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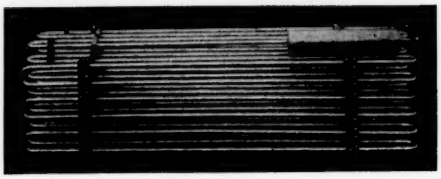
Whether your next job be for a single bend, or coil or complete piping system, Chicago Nipple can supply your requirements. Experienced workmen, practical engineers, and modern equipment reflect the quality of our products.



Coils are of selected ammonia pipe—all joints are electrically welded—checked under water with an air pressure of 300 pounds to guarantee tightness.

SEND DRAWING OR BLUE PRINT FOR QUOTATION

CHICAGO NIPPLE MFG. CO.

1997 Clybourn Ave., Chicago 14, Ill

Est. 1880

Wolf Linde

AMMONIA VALVES AND FITTINGS

FREON VALVES UP TO 12"

EVAPORATOR PRESSURE CONTROLS

AMMONIA COMPRESSORS

Manufactured and Sold by

DERSCH, GESSWEIN & NEUERT, Inc.

4849 West Grand Avenue Chicago 39, Illinois

THE BUYERS

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Refrigeration Engineering Corp., Philadelphia, Pa.

AIR COMPRESSORS
Baker Refrigeration Corp. So. Windham, Maine
Frick Co., Waynesboro, Pa.

AIR CONDITIONING EQUIPMENT
Baker Refrigeration Corp. So. Windham, Maine
Frick Co., Waynesboro, Pa.
Howe Ice Machine Co., Chicago, Ill.
Niagara Blower Co., New York, N.Y.
Refrigeration Engineering, Inc. Los Angeles, Calif.

AIR PURIFYING EQUIPMENT
General Ozone Corp., Chicago, Ill.

AMMONIA COMPRESSOR VALVES
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Voss, Inc., J. H. H., New York, N.Y.

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Creamery Package Mfg. Co., Chicago, Ill.
Dersch, Gesswein & Neuert, Inc. Chicago, Ill.
Frick Co., Waynesboro, Pa.
Howe Ice Machine Co., Chicago, Ill.
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Howe Ice Machine Co., Chicago, Ill.
Vogt Machine Co., Henry, Louisville, Ky.

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Creamery Package Mfg. Co., Chicago, Ill.
Dersch, Gesswein & Neuert, Inc., Chicago, Ill.
Frick Co., Waynesboro, Pa.
Howe Ice Machine Co., Chicago, Ill.
Kehoe Machinery Co., Inc., R. F., Ridgefield Park, N. J.
National Pipe Bending Co., New Haven, Conn.
Pittsburgh Pipe Coil & Bending Co.,
Rempe Company, Chicago, Ill.
Reynolds Mfg. Co., Springfield, Mo.
Vogt Machine Co., Henry, Louisville, Ky.

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Shank Co., Cyrus, Chicago, Ill.

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Ophuls & Associates, Fred, New York, N. Y.

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Armstrong Machine Works, Three Rivers, Mich.
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Frick Co., Waynesboro, Pa.
Phillips & Co., H. A., Chicago, Ill.
Rex Engineering & Sales Co., Oklahoma City, Okla.

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Index Coupon & Supply Co., La Porte, In.
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Union Bag & Paper Corp., New York, N. Y.
United Ice & Oil Supply Co., Boston, Mass.

BAGS, WATERPROOF PAPER
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International Paper Co., New York, N. Y.
Union Bag & Paper Co., New York, N. Y.

BEER COOLERS
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Vogt Machine Co., Henry, Louisville, Ky.

BLOWERS
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Ice Plant Equipment Co., Inc., Philadelphia, Pa.
Lamson Corp., Syracuse, N. Y.
Refrigeration Engineering Corp., Philadelphia, Pa.
Roots-Connersville Blower Corp., Connersville, Ind.

BOILERS
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Vogt Machine Co., Henry, Louisville, Ky.

BOILER TUBES
Byers Co., A. M., Pittsburgh, Pa.

BOOKS—TECHNICAL
Nickerson & Collins Co., Chicago, Ill.

BRINE CIRCULATORS
Creamery Package Mfg. Co., Chicago, Ill.
Frick Co., Waynesboro, Pa.
Ice Plant Equipment Co., Inc., Philadelphia, Pa.

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Roots-Connersville Blower Corp., Connersville, Ky.

BRINE COOLERS
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Baker Refrigeration Corp., So. Windham, Maine
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Frick Co., Waynesboro, Pa.
Kehoe Machinery Co., Inc., R. P., Ridgefield Park, N. J.
Refrigeration Engineering Corp., Philadelphia, Pa.
Reynolds Mfg. Co., Springfield, Mo.
Vogt Machine Co., Henry, Louisville, Ky.

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Acme Industries, Inc., Jackson, Mich.
Frick Co., Waynesboro, Pa.

BRINE TREATMENT
Chemical Solvent Co., Birmingham, Ala.

CALCIUM CHLORIDE
Solvay Sales Div., Allied Chemical & Dye Corp., New York, N. Y.

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Ice Plant Equipment Co., Inc., Philadelphia, Pa.
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Refrigeration Engineering Corp., Philadelphia, Pa.
Reynolds Mfg. Co., Springfield, Mo.
Vogt Machine Co., Henry, Louisville, Ky.

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Capital Elevator & Mfg. Co., Columbus, Ohio
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The Lilly Co., Memphis, Tenn.
Link-Belt Co., Chicago, Ill.
Tri-Pak Machinery Service Inc., Harlingen, Texas

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Byers Co., A. M., Pittsburgh, Pa.
Chicago Nipple Mfg. Co., Chicago, Ill.
Creamery Package Mfg. Co., Chicago, Ill.
Detroit Ice Machine Co., Detroit, Mich.
Howe Ice Machine Co., Chicago, Ill.
National Pipe Bending Co., New Haven, Conn.
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Frick Co., Waynesboro, Pa.
Refrigeration Engineering Corp., Philadelphia, Pa.
Vogt Machine Co., Henry, Louisville, Ky.

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Ice Plant Equipment Co., Inc., Philadelphia, Pa.
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Voss, Inc., J. H. H., New York, N. Y.

COMPRESSORS
(See Ice Making and Refrigerating Machinery)
(See Air Compressors)

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Baker Refrigeration Corp., So. Windham, Maine
Creamery Package Mfg. Co., Chicago, Ill.
Dersch, Gesswein & Ueuert, Inc., Chicago, Ill.
Frick Co., Waynesboro, Pa.
Howe Ice Machine Co., Chicago, Ill.
Kehoe Machinery Co., Inc., R. P., Ridgefield Park, N. J.
King-Zeero Co., Chicago, Ill.
National Pipe Bending Co., New Haven, Conn.
Philadelphia Pipe Bending Co., Philadelphia, Pa.
Pittsburgh Pipe Coil & Bending Co., Pittsburgh, Pa.
Reynolds Mfg. Co., Springfield, Mo.
Vogt Machine Co., Henry, Louisville, Ky.

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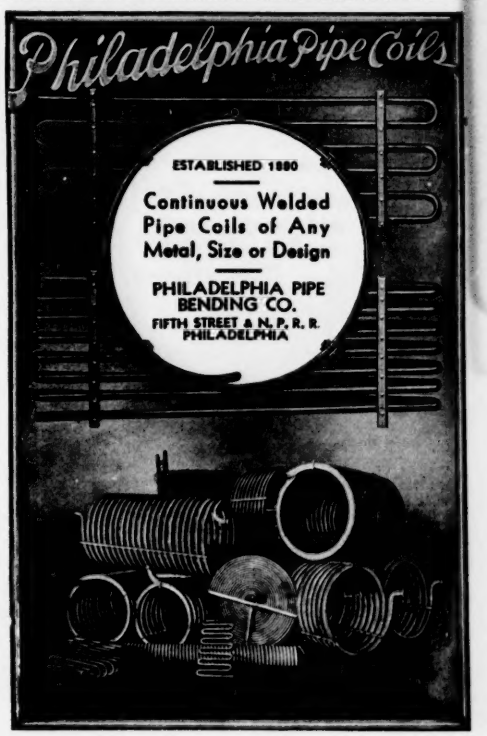
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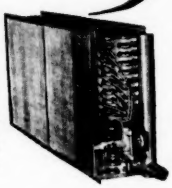

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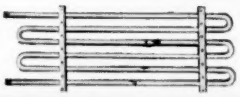

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Gifford-Wood Co., Hudson, N. Y.
The Lilly Co., Memphis, Tenn.
Link-Belt Co., Chicago, Ill.

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(See Architects and Engineers)

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Frick Co., Waynesboro, Pa.

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Refrigeration Engineering, Inc., Los Angeles, Calif.

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Frick Co., Waynesboro, Pa.
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Refrigeration Engineering, Inc., Los Angeles, Calif.
Vogt Machine Co., Henry, Louisville, Ky.

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Vogt Machine Co., Henry, Louisville, Ky.

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Vivian Mfg. Co., St. Louis, Mo.

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Link-Belt Co., Chicago, Ill.
Refrigeration Engineering Corp., Philadelphia, Pa.

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The Lilly Co., Memphis, Tenn.
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Frick Co., Waynesboro, Pa.
Vogt Machine Co., Henry, Louisville, Ky.

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The Lilly Co., Memphis, Tenn.
Link-Belt Co., Chicago, Ill.
Refrigeration Engineering Corp., Philadelphia, Pa.
Tri-Pak Machinery Service Inc. Harlingen, Texas
United Ice & Oil Supply Co., Boston, Mass.
Vivian Mfg. Co., St. Louis, Mo.

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The Lilly Co., Memphis, Tenn.
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Vivian Mfg. Co., St. Louis, Mo.

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Vivian Mfg. Co., St. Louis, Mo.

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Union Bag & Paper Corp., New York, N. Y.
United Ice & Oil Supply Co., Boston, Mass.
Vivian Mfg. Co., St. Louis, Mo.

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Gifford-Wood Co., Hudson, N. Y.
Link-Belt Co., Chicago, Ill.

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Enterprise Equipment Corp., Yonkers, N. Y.
Frick Company, Waynesboro, Pa.
Howe Ice Machine Co., Chicago, Ill.
Ice Plant Equipment Co., Inc. Philadelphia, Pa.
Kehoe Machinery Co., Inc., R. P., Ridgefield Park, N. J.
Refrigeration Engineering Corp., Philadelphia, Pa.
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The Lilly Co., Memphis, Tenn.
United Ice & Oil Supply Co., Boston, Mass.
Vivian Mfg. Co., St. Louis, Mo.

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Texas Co., The, New York, N. Y.

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Texas Co., The, New York, N. Y.

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Vogt Machine Co., Henry, Louisville, Ky.

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Rempe Company, Chicago, Ill.
Vogt Machine Co., Henry, Louisville, Ky.

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Refrigeration Engineering Corp., Philadelphia, Pa.

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Roots-Connersville Blower Corp., Connersville, Ind.

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Vogt Machine Co., Henry, Louisville, Ky.

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Ice Plant Equipment Co., Inc., Philadelphia, Pa.
Roots-Connersville Blower Corp., Connersville, Ind.

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Rex Engineering & Sales Co., Oklahoma City, Okla.

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Ice Plant quipment Co., Inc., Philadelphia, Pa.
Refrigeration Engineering Corp., Philadelphia, Pa.
Vogt Machine Co., Henry, Louisville, Ky.

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S & S Vending Machine Co., San Jose, Calif.
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Acme Protection Equipment Co., Chicago, Ill.

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Bower Chemical Mfg. Co., Henry, Philadelphia, Pa.

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Perfection Ice Scoring Machine Co., Fort Worth, Texas
United Ice & Oil Supply Co., Boston, Mass.

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Kehoe Machinery Co., Inc., R. P., Ridgefield Park, N. J.
United Ice & Oil Supply Co., Boston, Mass.

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Frick Company, Waynesboro, Pa.
King-Zeero Company, Chicago, Ill.
National Pipe Bending Co., New Haven, Conn.
Vogt Machine Co., Henry, Louisville, Ky.

SHOULDER PADS
Gifford-Wood Co., Hudson, N. Y.
Index Coupon & Supply Co., La Porte, Ind.
The Lilly Co., Memphis, Tenn.
United Ice & Oil Supply Co., Boston, Mass.
Vivian Mfg. Co., St. Louis, Mo.

SIZED ICE EQUIPMENT
Bateman Foundry & Machine Co., Inc., Mineral Wells, Texas
Gifford-Wood Co., Hudson, N. Y.
Ice Plant Equipment Co., Inc., Philadelphia, Pa.
The Lilly Co., Memphis, Tenn.
Vivian Mfg. Co., St. Louis, Mo.

SPRAY NOZZLES
Ice Plant Equipment Co., Inc., Philadelphia, Pa.
Refrigeration Engineering Corp., Philadelphia, Pa.

SPRAY PONDS
Frick Company, Waynesboro, Pa.
Refrigeration Engineering Corp., Philadelphia, Pa.

STORAGE HEATERS
National Pipe Bending Co., New Haven, Conn.

STRAINERS
Ice Plant Equipment Co., Inc., Philadelphia, Pa.

TANKS
Frick Company, Waynesboro, Pa.
Vogt Machine Co., Henry, Louisville, Ky.

TARPAULINS
Ice Plant Equipment Co., Inc. Philadelphia, Pa.
Index Coupon & Supply Co., La Porte, Ind.
The Lilly Co., Memphis, Tenn.
United Ice & Oil Supply Co., Boston, Mass.
Vivian Mfg. Co., St. Louis, Mo.

THERMOMETERS
Ice Plant Equipment Co., Inc. Philadelphia, Pa.
Refrigeration Engineering Corp., Philadelphia, Pa.

TIERING MACHINES
Capital Elevator & Mfg. Co., The, Columbus, Ohio
Gifford-Wood Co., Hudson, N. Y.

TRAPS, OIL & STEAM
Armstrong Machine Works, Three Rivers, Mich.

TRUCKS, MOTORIZED LIFT
The Moto-Truc Co., Cleveland, Ohio

UNIT COOLERS
Acme Industries, Inc., Jackson, Mich.
Howe Ice Machine Co., Chicago, Ill.
Niagara Blower Co., New York, N.Y.
Refrigeration Engineering, Inc., Los Angeles, Calif.

USED MACHINERY
Enterprise Equipment Corp., Yonkers, N. Y.
Kehoe Machinery Co., Inc., R. P., Ridgefield Park, N. J.

VALVES AND FITTINGS
Alco Valve Co., St. Louis, Mo.
Frick Company, Waynesboro, Pa.
Ice Plant Equipment Co., Inc., Philadelphia, Pa.
Kehoe Machinery Co., Inc., R. P., Ridgefield Park, N. J.
Phillips & Co., H. A., Chicago, Ill.
Refrigeration Engineering Corp., Philadelphia, Pa.
Rempe Co., Chicago, Ill.
Shank Co., Cyrus, Chicago, Ill.
Vogt Machine Co., Henry, Louisville, Ky.

VALVES, COMPRESSOR
Voss, Inc., J. H., New York, N. Y.

WATER COOLERS
Acme Industries, Inc., Jackson, Mich.
Niagara Blower Co., New York, N.Y.

WATER SUPPLY CONTRACTORS
Layne & Bowler, Inc., Memphis, Tenn.

WATER TREATMENT MATERIALS
Chemical Solvent Co., Birmingham, Ala.
Industrial Filter & Pump Mfg. Co. Inc., Chicago, Ill.

WELDING
Frick Company, Waynesboro, Pa.
Philadelphia Pipe Bending Co., Philadelphia, Pa.
Pittsburgh Pipe Coil & Bending Co., Pittsburgh, Pa.
Rempe Company, Chicago, Ill.
Vogt Machine Co., Henry, Louisville, Ky.

WELL SCREENS
Layne & Bowler, Inc., Memphis, Tenn.

WROUGHT IRON PIPE
Byers Co., A. M., Pittsburgh, Pa.

BUYERS DIRECTORY CONTINUED—NEXT PAGE

In all parts of the world . . . under all conditions — OUTSTANDING PERFORMANCE. That is the reputation Recold Water Defrost Coils have earned. For ice cream hardening rooms, for food freezing rooms — for *every* low temperature application — Recold Water Defrost Coils will give you greater efficiency with lower operating cost.

Investigate the features of the Recold Water Defrost Coil that *"Freezes While Defrosting"*. Write today for complete information.

Refrigeration ENGINEERING, INC.
7250 East Slauson Avenue • Los Angeles 22, California

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ARE YOU?

Please Ice Customers. Keep them With Extra fine Long Lasting PICKS

Every plant and ice station should have a PICKWELL vendor.

10c mechanism		15c mechanism	
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2—9	31.00 ea.	2—9	42.00 ea.

Write for Details

UNITED ICE SUPPLY CO.
55 BEVERLY BOSTON 14, MASS.

Classified Advertising

All classified advertisements are payable in advance. Except for Positions and Help Wanted classifications, this section is reserved exclusively for the purchase and sale of USED equipment, existing and used plants, and surplus material or equipment.

RATES: $3.50 for 50 words or less; 60c for each additional 10 words or fraction thereof; 75c per line for bold face headings; $6.00 per inch on three column page ($9.00 per inch on two column page) for ads all set in bold face type or listing items on separate lines.

USED MACHINERY—wanted & for sale

WANTED—Used crusher-slinger unit. Give specifications, condition and price. Write Box 444, Gainesville, Georgia.

FOR SALE—Natural ice harvesting machinery, equipment and tools. We have discontinued our natural ice harvesting, therefor we have everything you need for cutting and storing natural ice. Priced at 25% of original cost plus dismantling and carting. Utica City Ice Corp., 65 Wurz Ave., Utica, N. Y.

FOR SALE—York 4x4 and Frick 3x3 self-contained. York 3x3, 4x4, 5x5, 6x6, 7½x7½, 8x8 and 9x9 compressors, splash lubrication. Four Acme Freon suspended type blowers. One Frick 10 h.p. Freon unit. Reconditioned valves up to 3". Write Edwin Niebling, 1546 St. Clair Ave., Cincinnati 31, Ohio.

FOR SALE—Brand new latest type ammonia compressors. Onec 8"x8" Frick, two 5"x5" Worthingtons, one 5½"x5½" Vilter, all with V belt drives, also new 60 h.p. motor. All just as received from the factories but at lower prices. Address Box SP-3, Ice and Refrigeration, 435 N. Waller Ave., Chicago 44, Ill.

FOR SALE—York and Arctic 9x9 compressors, York 5x5, Frick 6x6, Baker 4½x5. Small Lipman units, 288 Arctic Pownall ice cans; shell and tube condenser and brine cooler; ammonia receivers; 5 h.p. vertical agitator; 3 h.p. Hoffman blower; coils, fittings; 150 and 180 h.p. oil engines; generators, motors. Parke Pettegrew & Son Co., 370 W. Broad St., Columbus 8, Ohio.

FOR SALE—One 6¾"x5" V/W York ammonia booster compressor 8 cylinder V-belt drive complete with base, including 440 volt A.C. motor and 36"x 12' long D.E. gas and liquor cooler plus valves. This equipment is new and has never been installed. If interested contact W. A. Moore, General Manager, New Orleans Cold Storage & Warehouse Co. Ltd., 305 Gaiennie St., New Orleans, La.

CLOSEOUT SALE—We wish to liquidate our stock of small compressors, etc. Any reasonable offer will be accepted for the following: 1 brand new PAR 1 h.p. compressor, methyl chloride, 60 cycle, 220 volt, 3-phase AC motor; never used. 1 York 9x4 ammonia compressor, self-contained, double cylinder type, used about 3 months. Arctic 5 h.p. ammonia compressor with 220 volt, 3 phase AC motor. Creamery Package, 3 h.p. ammonia compressor, self-contained. Several other small compressors, including Frigidaire, Arctic, etc.; also two Frick shell and tube ammonia condensers 18' long by 24" diameter, multi-pass design. Excellent condition; make us an offer. Chas. S. Jacobowitz Co., 3080 Main St., Buffalo 14, N. Y. Phone Amherst 2100.

FOR SALE—ICE PLANTS AND EQUIPMENT

1—30 ton York ice making plant, trunk coil, 4 can pull electric driven.
1—25 ton York ice making plant, brine coolers, electric driven.
1—12 ton York ice making plant, trunk coil electric driven.
2—10x10 Frick ammonia compressors, direct connected to synchronous motor.
1—10x10 York ammonia compressor, late type 360 r.p.m.
1—10x10 York ammonia compressor 250 r.p.m.
1—9x9 York ammonia compressor 250 r.p.m.
1—9x9 York ammonia compressor 200 r.p.m.
1—8x8 Frick ammonia compressor, late type with capacity control valves.
1—8x8 Frick ammonia compressor 277 r.p.m.
1—7x7 Worthington 400 r.p.m.
2—6½x6½ York high speed ammonia compressors, late type.
1—6x6 York 300 r.p.m.
1—5x5 York late style self contained unit.
Assorted brine coolers and condensers ASME coded vessels, like new.

B & E REFRIGERATING CO.
2 Orange St., Newark 2, N. J.
Phone: Mitchell 3-7790 Cable Address "BERECO"

USED MACHINERY—continued

FOR SALE—Two 100 lb. Thermo Cubers in excellent condition. Any reasonable offer will be considered. Acme Ice Co., 3604 W. 59th St., Chicago 29, Ill.

WANTED—Good, used marine refrigeration equipment in part or complete, preferably three sets of 25 ton refrigeration capacity each, with DC 230 volt motors, starters, condensers, coils, valves, fans, bronze condensing water pumps, etc. Address Box SP-12, Ice and Refrigeration, 435 N. Waller Ave., Chicago 44, Ill.

FOR SALE—ICE PLANTS AND EQUIPMENT

30-35-50 Ton Ice Plants

1—10"x10" York Ammonia compressor direct connected to a 60 H.P. synchronous motor 200 R.P.M.
1—10"x10" York ammonia compressor direct connected to 100 H.P. synchronous motor 200 R.P.M.
1—9"x9" ammonia compressor direct connected to 50 H.P. synchronous motor 200 R.P.M.
1—10"x10" York ammonia compressor 200 R.P.M.
1—Duplex 10"x10" Worthington Carbondale High Speed compressor direct connected to 250 H.P. synchronous motor.
1—6"x6" Voss Ammonia compressor.
2—4"x4" H.S. self contained units.
1—3"x3" Frick H.S. self contained units.
1—25" dia. x 10'-0 long 5 pass enclosed type ammonia condensers. Assorted sizes electric hoists ranging from 2 to 6 ton capacity.
1—Gifford Wood Uline Scoring Machine series No. 3.
1—Gifford Wood four tier, ice tiering machine.
2—Gifford Wood Creasey Ice Crushers, motor driven.

Assorted sizes of ice cans.

Brine coolers, double pipe 2" and 2" horizontal brine coolers, submerged Shell and tube type 1¼" and 2" ammonia coils approximately 10,000 feet. Send us your requirements on any equipment you may need.

Enterprise Equipment Corporation
77-79 Alexander St., Yonkers, N. Y.
Phone Yonkers 8-8118-9
Cable address: ENEQCO

Don't let your profits go "south" by having a piece of idle machinery that can be converted into cash or by doing a job the old way when a classified ad will find a buyer or the equipment you require.

Rates are at the top of this page—closing is the fifteenth of the month. *May we serve you?*

ICE PLANTS—wanted & for sale

FOR SALE—at sacrifice—two 30 ton York ice plants; just shut down; everything in excellent condition. Must vacate building. For further information, please write or wire Box 642, Central Y M.C.A., Reed & Washington Sts., Reading, Pa.

FOR SALE—240 can ice plant, water power driven. No competition. Excellent location for wholesale meat packing or distributing plant. Close to New York City. Address Box SP-10, Ice and Refrigeration, 435 N. Waller Ave., Chicago 44, Ill.

FOR SALE—18 ton ice plant. All equipment in excellent condition. New blower type condenser. One new 72 can tank, others good condition. 216 cans. Large industrial area, oil and farming. Owner needs rest. Inspection invited. Priced $1250. per ton of ice for quick sale. Write for appointment. Address P.O. Box 486, Stroud, Okla.

FOR SALE—Established ice-locker plant, 15 ton fully automatic. 30 cash carry stations, 356 lockers, 95% rented. Complete processing service. Block-frame building 60x75. Low operating cost, little competition. Rapidly growing town, new resort area, Ozark great lakes region. Write for full details. Opportunity Land Co., Mountain Home, Arkansas.

WANTED—50 to 75 ton ice plant complete; must be in good condition; state full particulars; lowest cash price and what railroad facilities are available for moving the complete equipment. Charles A. Schultz, 227 W. 64th St., New York City. Phone TR 3-3515.

FOR SALE—Complete equipped Ice Plant; excellent condition; 30 ton daily capacity; all wholesale sold to truckers; brick building 50x100; large lot on railroad; nice four room home; no near competition; city of 17,000; Western Pennsylvania; retiring; sell with property; price reasonable. The Apple Co., Cleveland, Ohio.

FOR SALE—224 can York ice plant, electric with double hoist and filler, six trucks, large storage, scoring machine and sizer. Shoe repair shop to get you through the winter. Property located on very valuable lot. Property and equipment appraised at $64,865.00; will take $55,000.00 cash. Inspection invited. Steele Ice Co., Jackson, Mississippi.

WANTED—Electrical-Mechanical engineer with broad ice, electric, water and utility construction and management experience would be interested in purchasing a business or part thereof. Preferably located in South or West. Please furnish complete price, terms and details first letter. Replies treated confidentially. Address Box SP-8, Ice and Refrigeration, 435 N. Waller Ave., Chicago 44, Ill.

WANTED—Complete used Frick, York 300 lb. can ice plants 10 to 40 tons, 220-60-3 drive low pressure air, also high speed Frick, York ammonia compressors 4x4 to 10x10, shell-tube condensers, receivers, boosters. Only modern equipment. Give year installed, serial numbers, detailed description, price F.O.B. Prefer Illinois and West. No dealers. Address Box SP-17, Ice and Refrigeration, 435 N. Waller Ave., Chicago 44, Ill.

FOR SALE or RENT—Move or start your plant at this ideal location. Low labor and utilities costs. River and railroad facilities. Eight miles from New Orleans, Louisiana. 17,000 square foot new building. What you will save on lower costs will show a good profit on a reasonable volume. Owner, J. W. MacClatchie, Route 1, Saugus, Calif.

FOR SALE—a low temperature cold storage plant, approximately 165,000 cu. ft. (16 to 1800 tons of storage). Quick freezing facilities for 30 tons per day. All new equipment in 1946 and 1947. Plant designed for expansion up to 100 tons freezing per day. Plant owns a food processing building adjacent, which is leased for seven years, with leasee guarantees 2000 tons freezing per year. $100,000.00 cash required, balance seven years on terms. Owner wishes to retire. Prosser Freeze Plant, C. C. Andrews, Owner, Prosser, Wash.

FOR SALE—IMMEDIATE REMOVAL
At your own price

100 ton DeLaVergne ice plant, complete, electric, with transformer room — high pressure — perfect shape. Consisting of:
2 DeLaVergne compressors, direct connected to synchronous motors; 25 cycle.
2 tanks—750 cans each; Two-can crane; 2 air compressors; water tower; new condensers—atmospheric; 2 tower pumps. All other auxiliary machinery.

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1517 N. Gay St. Baltimore 13, Md.

USED ICE MACHINES AND EQUIPMENT

All Used Equipment Is Reconditioned In Our Modern Machine Shop

THIS IS ONLY A PARTIAL LIST-WRITE ABOUT ANY REQUIREMENTS WHICH YOU HAVE WE ARE BUYING ADDITIONAL EQUIPMENT ALL OF THE TIME

Compressors With or Without Motors

	Item No.
1—4x4 York, 300 RPM	16
6—6x6 York's, 200 RPM	20
1—6x6 Frick, 257 RPM	21
1—6x6 York, 400 RPM, forced-feed lubrication	25
2—6½x6½ Arctics, 350 RPM, forced feed lub.	30
1—7¼x7¼ Baker, 350 RPM, forced feed lubrication	35
1—7x7 Frick, 200 RPM	40
1—7½x7½ York, 200 RPM	51
2—7½x7½ Yorks, 350 RPM, forced-feed lubrication	54
1—8x8 Frick, 400 RPM forced feed lub., V-belt wheel	57
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1—9x9 Arctic, 300 RPM, forced feed lub	62
1—9x9 York, 200 RPM	71
1—9x9 Worthington, 325 RPM, forced feed lub.	72
1—10x10 De La Vergne, 360 RPM, forced feed lub.	73
1—10x10 York, 257 RPM, forced feed lub.	80
1—10x10 Carbondale, 100 HP synch. motor, 350 RPM	81
3—10x10 York's, 225 RPM, semi-forced feed lub.	82
1—11x13 York, 164 RPM, forced feed lub.	90
1—17x18 Frick, direct conn. 300 HP synch. motor	91
2—12x12 Frick, direct conn. 150 HP synch. motor	98

Diesel Driven and Diesel Engines

1—8x8 York—Direct connected to 50 H.P. Fairbanks-Morse at 257 R.P.M. 210

Steam Driven

1—8x8 Vertical York, 300 R.P.M. direct connected 327

Pipe

10,000 feet wrought Iron pipe—2"—like new 451

Complete Ice Plants

	Item No.
1—20 ton, 240 can, Diesel-driven plant	626
1—15-ton electric driven plant	630
1—600 Can Trunk Coil Type—York Plant, Brand New Tank. *Complete with 10 Can Grids. This plant is equal to new*	631
Brand New 8 to 10-ton Clear Ice-Making Plants—110 Cans—Electric or Diesel Drive—2 Can Pull	632
1—*247 Can, 22-ton ice plants, like new*	632A
1—35-38 ton New Clear Ice Making Plants	635
1—150 Ton Multi lift—1622 Can Plant	636
1—702 Can Plant—9 Can Pull	637
1—920 Can Plant—12 Can Pull	638

Self-Contained Units

3—4x4 York & Fricks	742
1—5x5 York—390 R.P.M.	743
1—4½x5 Lipman—360 R.P.M.	744
1—3x3 Worthington	748
1—5x5 Frick—Forced Feed—400 R.P.M. Latest Type	758

Brine Coolers

1—34x10—100—2	802
1—48"x16'—130—2" tubes	808

Condensers

3—100 ton shell and tube condensers retubed	919
1—125-ton, Vertical Shell & Tube, 196 2" tubes	921
1—120 ton, 216—2" retubed Vertical Shell & Tube	922
2—20 ton Horizontal—retubed	924

Ice Cans

150—11½"x22½"x44"—cap refinished in zinc
500—11"x22"x47"—ice cans

NEW EQUIPMENT FOR IMMEDIATE DELIVERY

Compressors With or Without Motors

	Item No.
3x3 to 5 x 5 —390 R.P.M.	1001
6x6 to 10x10—390 R.P.M.	1002
3x3 to 5 x 5 —Self-contained units, complete	1003
5x5—Self contained—15 H.P. motor—V Belt	1004

Ammonia Condensers

4—12¾x12 Horizontal—36—1¼" tubes	1020
2—30x14 Vertical 109—2" tubes	1021
1—16"x10"x10' Shell and Tube Condenser, 60 1¼" tubes	1022

Ice Cans

50—100 lb. cans—15½"x8"x31"	1041
40—50 lb. cans—6"x12"x26"	1042

Ammonia Valves and Fittings

	Item No.
⅜" to ¾"—Screwed Expansion Valves	1050
½" to 2"—Screwed Globe Valves	1051
1" to 6"—Square Flanged Globe Valves	1052
Check Valves	1053
Relief Valves	1054
Strainers	1055
Steel & Malleable Fittings	1056
Extra heavy Ammonia Nipples	1057

Ammonia Guages, Ammonia Receivers, Ice Crushers, Agitators, and Receivers and Oil Separators.

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ALLIED CHEMICAL & DYE CORPORATION
40 Rector Street, New York 6, N. Y.

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What's wrong with this picture?

These men are making a mistake that could cause a great deal of needless expense and trouble. In insulating the floor of a cold room, they're just dipping the corkboard in hot asphalt then applying it directly to the concrete floor. For a good job, a heavy flood or mop coat of hot asphalt should be applied to the floor first.

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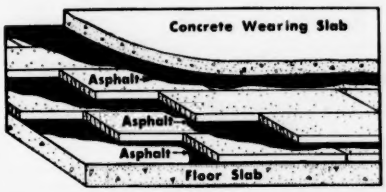

The extra cost of the asphalt required to do the job properly is trivial. Practical experience has taught Armstrong engineers that the right way is always less expensive in the long run.

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